NASA

Aerospace Medicine and Biology
A Continuing Bibliography with Indexes

NASA SP-7011(294)
February 1987

NASA SP-7011(294)

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 294)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in January 1987 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1987
National Aeronautics and Space Administration
Washington, DC

This supplement is available from the National Technical Information Service (NTIS), Springfield, Virginia 22161, price code A04.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 146 reports, articles and other documents announced during January 1987 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).* The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR,* including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Seven indexes — subject, personal author, corporate source, foreign technology, contract, report number, and accession number — are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1986 Supplements.

TABLE OF CONTENTS

Page

Category 51 Life Sciences (General) 1

Category 52 Aerospace Medicine 9
Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

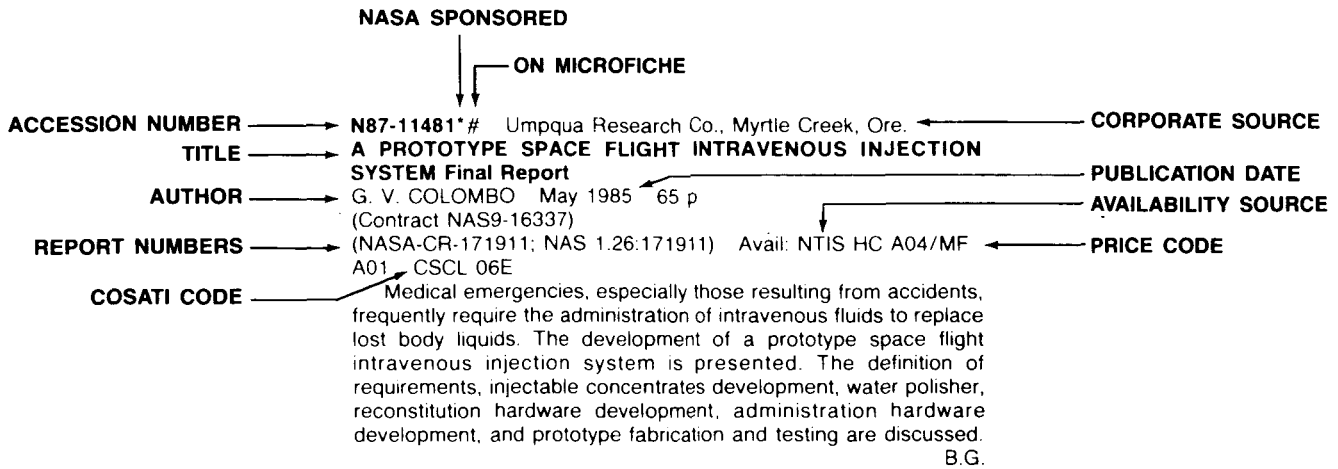
Category 53 Behavioral Sciences 18
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

Category 54 Man/System Technology and Life Support 19
Includes human engineering; biotechnology; and space suits and protective clothing.

Category 55 Space Biology 22
Includes exobiology; planetary biology; and extraterrestrial life.

Subject Index A-1
Personal Author Index B-1
Corporate Source Index C-1
Foreign Technology Index D-1
Contract Number Index E-1
Report Number Index F-1
Accession Number Index G-1

TYPICAL REPORT CITATION AND ABSTRACT



N87-11481*# Umpqua Research Co., Myrtle Creek, Ore.

A PROTOTYPE SPACE FLIGHT INTRAVENOUS INJECTION SYSTEM Final Report

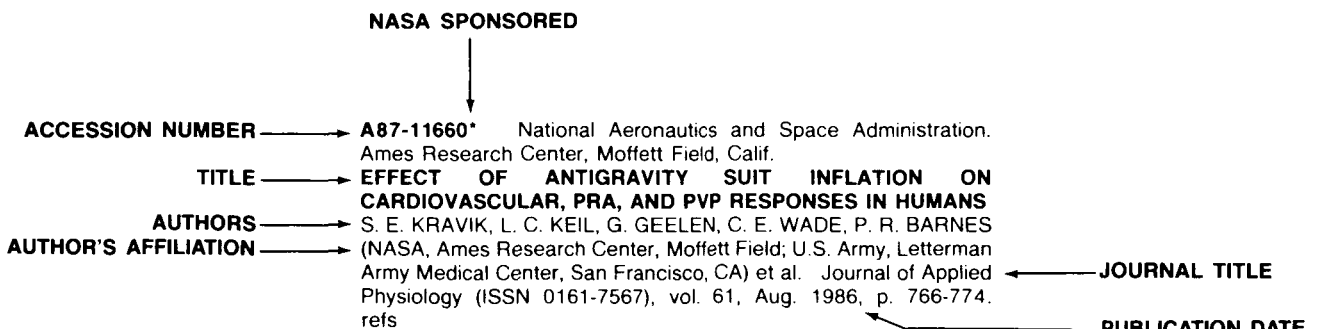
G. V. COLOMBO May 1985 65 p

(Contract NAS9-16337)

(NASA-CR-171911; NAS 1.26:171911) Avail: NTIS HC A04/MF A01 CSCL 06E

Medical emergencies, especially those resulting from accidents, frequently require the administration of intravenous fluids to replace lost body liquids. The development of a prototype space flight intravenous injection system is presented. The definition of requirements, injectable concentrates development, water polisher, reconstitution hardware development, administration hardware development, and prototype fabrication and testing are discussed. B.G.

TYPICAL JOURNAL ARTICLE CITATION AND ABSTRACT



A87-11660* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

EFFECT OF ANTIGRAVITY SUIT INFLATION ON CARDIOVASCULAR, PRA, AND PVP RESPONSES IN HUMANS

S. E. KRAVIK, L. C. KEIL, G. GEELEN, C. E. WADE, P. R. BARNES

(NASA, Ames Research Center, Moffett Field; U.S. Army, Letterman Army Medical Center, San Francisco, CA) et al. Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 766-774. refs

The effects of lower body and abdominal pressure, produced by antigravity suit inflation, on blood pressure, pulse rate, fluid and electrolyte shift, plasma vasopressin and plasma renin activity in humans in upright postures were studied. Five men and two women stood upright for 3 hr with the suit being either inflated or uninflated. In the control tests, the suit was inflated only during the latter part of the trials. Monitoring was carried out with a sphygnomanometer, with sensors for pulse rates, and using a photometer and osmometer to measure blood serum characteristics. The tests confirmed earlier findings that the anti-g suit eliminates increases in plasma renin activity. Also, the headward redistribution of blood obtained in the tests commends the anti-g suit as an alternative to water immersion or bed rest for initial weightlessness studies. M.S.K.

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 294)

FEBRUARY 1987

51

LIFE SCIENCES (GENERAL)

were observed. It is noted that a progressive increase in the parasympathetic tone was observed. Future flights are planned for comparing the neuro-vegetative processes of this type of primate with those of humans. M.S.K.

A87-10298
ULTRADIANT RHYTHMS IN PHYSIOLOGY AND BEHAVIOR
H. SCHULZ, ED. (Max-Planck-Institut fuer Psychiatrie, Munich, West Germany) and P. LAVIE, ED. (Technion - Israel Institute of Technology, Haifa) Berlin and New York, Springer-Verlag (Experimental Brain Research. Supplementum 12), 1985, 347 p. No individual items are abstracted in this volume.

Ultradian rhythms (URs) in man and animals are discussed in reviews and reports of experimental and theoretical investigations presented at a workshop held at Seewiesen, Germany, in September 1984. Topics examined include URs in the behavior of the common vole; pulsatility of pituitary hormones; URs in locomotor activity, deep-body temperature, and plasma corticosterone levels in rats; urinary URs in dogs; URs in the nychthemeron of narcoleptic patients and normal subjects; the basic rest-activity cycle; and URs during sustained performance. Consideration is given to ultradian components of human sleep-wake patterns; sleep cycles as the basic unit of sleep, an iterative nonorthogonal r-squared search for a REM-sleep cycle, limit-cycle models of REM-sleep URs, UR/circadian-rhythm interactions, and the diversity and uniformity of URs. T.K.

A87-10440
GENERAL-BIOLOGICAL CHARACTER OF THE ADAPTIVE CAPACITIES OF THE METABOLISM OF MAMMALS IN RESPONSE TO DIFFERENT EXTREME ENVIRONMENTAL FACTORS [OBSHCHEBIOLOGICHESKII KHARAKTER ADAPTATSIONNYKH VOZMOZHNOSTEI METABOLIZMA MLEKOPITAIUSHCHIKH NA VOZDEISTVIE RAZLICHNYKH EKSTREMAL'NYKH FAKTOROV SREDY]
B. M. GRAEVSKAIA and N. N. ZOLOTAREVA (AN SSSR, Institut Evoliutsionnoi Morfologii i Ekologii Zhivotnykh, Moscow, USSR) Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 289, July-Aug. 1986, p. 250-252. In Russian. refs

A87-10563
THE FLIGHT OF THE BIOSATELLITE COSMOS 1514 - AN ECG STUDY OF RHESUS MACAQUE MONKEYS [ETUDE DE L'ELECTROCARDIOGRAMME DES MACAQUES RHESUS]
R. BLOSTIN, C. MILHAUD, B. CAILLER, P. PESQUIES (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris, France), V. MELNICHENKO (Institut Mediko-Biologicheskikh Problem, Moscow, USSR) et al. Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 110-118. In French. refs

An analysis is presented of ECG data collected during automatic monitoring of two Rhesus monkeys on the 9 day flight of the Cosmos 1514 spacecraft. The heart rates of the monkeys varied between 60-220 bpm. An intervallometer was used to obtain tachistoscopic views of the heartbeat patterns over time, thereby revealing the average heart rate, transient events, respiratory and sinusoidal arrhythmias, and occurrences of bradycardia. No cardiac-linked impediments to long-term weightless spaceflight

A87-10661
NATURAL RADIATION BACKGROUND - ASPECTS OF RADIONUCLIDE MIGRATION AND BIOLOGICAL EFFECTS [ESTESTVENNYI RADIATSIONNYI FON - PROBLEMY MIGRATSII RADIONUKLIDOV I BIOLOGICHESKOGO DEISTVIIA]
R. M. ALEKSAKHIN (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Sel'skokhoziaistvennoi Radiologii, Obninsk, USSR), V. A. KNIZHNIKOV (Institut Biofiziki, Moscow, USSR), and A. I. TASKAEV (AN SSSR, Institut Biologii, Syktyvkar, USSR) Radiobiologiia (ISSN 0033-8192), vol. 26, May-June 1986, p. 292-301. In Russian. refs

The natural radiation background is the main contributor to radiation doses delivered to the earth's biological systems. The aspects of the migration and distribution of the main radioactive isotopes and their decay products throughout the biosphere, and the effects of geological and geomorphological factors on the distribution are discussed, together with the task of determining the dose contributions by various radioisotopes. The biological significance of the earth's natural radiation background is considered. Special attention is given to the role of natural radiation in the evolution process and to the tasks of further biological research in evaluating the role of natural radiomutagenesis. I.S.

A87-10662
COMPARATIVE STUDY OF THE BIOLOGICAL PROPERTIES OF SOME BACTERIAL POLYSACCHARIDES [SRAVNITEL'NOE ISSLEDOVANIE BIOLOGICHESKIKH SVOISTV RIADA BAKTERIAL'NYKH POLISAKHARIDOV]
IU. E. STRELNIKOV, N. I. LIBIKOVA, E. I. MILEVSKII, and L. A. SHAROVA (Voenno-Meditsinskaia Akademiia, Leningrad, USSR) Radiobiologiia (ISSN 0033-8192), vol. 26, May-June 1986, p. 323-328. In Russian. refs

The toxicity and the radioprotective effect of ten bacterial polysaccharides extracted from intestinal and soil bacteria, a lipopolysaccharide from actinomycetes, and vaccines against several intestinal pathogens, were investigated in mice, rats, guinea pigs, and dogs. The polysaccharides extracted from soil bacteria and from actinomycetes were less toxic (by two orders of magnitude) than those from intestinal bacteria (including E. coli). All polysaccharides exhibited a radioprotective effect, the antitiphoid/paratiphoid vaccine and the actinomycetic lopopolysaccharide being most effective. The level of protection afforded by a sulfur-containing radioprotector, cystophos, against lethal doses of radiation was increased (from 42 percent survival after 30 days to 82 percent survival) by simultaneous injection of actinomycetic lipopolysaccharide, which by itself was not effective against lethal doses. I.S.

A87-10663
SYSTEMIC EFFECTS OF THE INTERACTION OF A LIVING ORGANISM WITH MICROWAVES [SISTEMNYE EFFEKTY VZAIMODEISTVIIA ORGANIZMA S MIKROVOLNAMI]
N. B. SUVOROV, N. N. VASILEVSKII, and V. V. URIASH (Nauchno-Issledovatel'skii Institut Eksperimental'noi Meditsiny, Leningrad, USSR) Radiobiologiia (ISSN 0033-8192), vol. 26, May-June 1986, p. 365-371. In Russian. refs

The effect of microwave irradiation on neurophysiological reactions of the vegetative nervous system and on animal behavior was studied in cats subjected to daily doses (4 and 8 hr) of microwave radiation (500 microWatt/sq cm at 2375 MHz). The bioelectric activity spectra revealed the presence of synchronization at 6-10 Hz and at 12-16 Hz, different sensitivities of brain structures to the EM field, changes in the heart rate, and an increased mobility and aggressiveness of the animals. From the results of this study, as well as the earlier results obtained on human subjects by Vasilevskii et al. (1982), it is concluded that a complex of interactive changes, rather than any one of the symptoms taken separately, should be considered as a specific effect of microwave radiation. I.S.

A87-10664
THE EFFECT OF INHIBITORS OF DNA SYNTHESIS ON THE SENSITIVITY OF MAMMALIAN CELLS TO IONIZING RADIATION OF DIFFERENT LINEAR ENERGY TRANSFER LEVELS [VLIIANIE INGIBITOROV SINTEZA DNK NA CHUVSTVITEL'NOST' KLETOK MLEKOPITAIUSHCHKIKH K DEISTVIIU IZLUCHENII S RAZNOI LINEINOI PEREDACHEI ENERGII]
R. D. GOVORUN, E. A. KRASAVIN, E. A. NASONOVA, and A. P. CHEREVATENKO (Ob'edinennyi Institut Iadernykh Issledovanii, Dubna, USSR) Radiobiologiia (ISSN 0033-8192), vol. 26, May-June 1986, p. 377-380. In Russian. refs

Cultured V79-4 Chinese hamster cells were irradiated by either gamma rays from Cs-137 or by accelerated carbon ions with the linear energy transfer value of 227 keV/micron. The survival rates of cells irradiated by either source in a standard medium were compared with the rates of survival in the same medium containing hydroxyurea and 2,2' anhydro 1-D-arabinofuranosylcytosine. The results have shown that, in the presence of the inhibitors, the radiosensitivity of the hamster cells to gamma rays increases 1.7 times. On the other hand, no sensitization occurred after irradiation with carbon ions. Under the standard conditions, the presence of DNA inhibitors caused a decrease of the relative biological effectiveness coefficient of carbon ions from the original value of 3.09 to 1.78. The possible mechanism of this phenomenon is discussed. I.S.

A87-10665
CHANGES IN THE ATP CONTENT AND THE SURFACE ADHESION IN CULTURED HUMAN CELLS IRRADIATED BY LASERS RAYS IN THE NEAR-UV RANGE [IZMENENIE SODERZHANIIA ATF I POVERKHNOSTNO-ADGEZIVNYKH SVOISTV KLETOK CHELOVEKA V KUL'TURE POD VOZDEISTVIEM LAZERNOGO IZLUCHENIIA V BLIZHNEI UF-OBLASTI SPEKTRA]
I. V. KHOKHLOV, I. B. FROLOV, and V. A. MOSTOVNIKOV (AN BSSR, Institut Fiziki, Minsk, Belorussian SSSR) Radiobiologiia (ISSN 0033-8192), vol. 26, May-June 1986, p. 415-418. In Russian. refs

A87-11135
EFFECT OF HYPOXIA ON HEART GLYCOGEN UTILIZATION DURING EXERCISE
C. Y. GUEZENNEC, B. SERRURIER, D. MERINO, and J. M. CLERE (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris, France) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, Aug. 1986, p. 754-758. refs

The effect of physical exercise on heart glycogen was studied in rats subjected to simulated elevated altitudes. Blood glucose, plasma free fatty acids, and cardiac glycogen were analyzed after 1-h-long and 5-h-long treadmill running sessions conducted at sea level at 3000 m, and at 5000 m. At sea level, the glycogen levels of the exercising rats did not differ from those of the nonexercising controls, while at the 3000-m altitude, the change from the controls was only a 15-percent decrease after 5 hours of running. On the other hand, running for only 1 h at the 5000-m altitude induced a total depletion of cardiac glycogen (and a 90-percent decrease from the control values). Two different mechanisms causing glycogen depletion during the exercise are suggested, one operating at the sea level and at moderate altitudes, and the other operating at extreme altitudes. The rapid depletion of glycogen at 5000 m is ascribed to a decreased mitochondrial function resulting from insufficient oxygen availability. I.S.

A87-11137
AMPHETAMINE AS A PROTECTIVE AGENT AGAINST OXYGEN-INDUCED CONVULSIONS IN MICE
C. O. CRIBORN, C.-J. CLEMEDSON, and C. HENRIKSSON (Forsvarets Forskningsanstalt, Stockholm, Sweden) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, Aug. 1986, p. 777-781. refs

A87-11326
PHYSICAL CAUSES OF THE ASYMMETRY OF LIVING SYSTEMS [FIZICHESKIE PRICHINY DISSIMMETRII ZHIVYKH SISTEM]
V. A. KIZEL Moscow, Izdatel'stvo Nauka, 1985, 120 p. In Russian. refs

Manifestations of right-left asymmetry in living systems, from the molecular level to the organismic level, are examined. Causes of this asymmetry are discussed, and it is found that this asymmetry is closely connected with the general problem of the origin of life. Particular consideration is given to the physical characteristics of chiral molecules and substances; the excitation of chirality and optical activity in molecules; the advantages that living systems receive from molecular chirality; the establishment and maintenance of chirality in living systems; statistical hypotheses relating to the appearance of asymmetry in living systems; and the role of weak interactions. B.J.

A87-11626
THE LONG AND THE SHORT OF LONG-TERM MEMORY - A MOLECULAR FRAMEWORK
P. GOELET, V. F. CASTELLUCCI, S. SCHACHER, and E. R. KANDEL (Columbia University; New York State Psychiatric Institute, New York) Nature (ISSN 0028-0836), vol. 322, July 31, 1986, p. 419-422. Research supported by the Helen Hay Whitney Foundation. refs

Long-term memory, unlike short-term memory, requires the synthesis of new proteins. Many of the processes are the same for both types of memory (learning) in that modulatory transmitters which affect previously synthesized proteins for short-term memory can also activate three other overlapping memory mechanisms, each with a specific temporal duration, e.g., hours, days and/or weeks and months. The interruption of protein synthesis or the experience of trauma or convulsions can inhibit learning and/or memory after learning. The precise chemicals and enzymes involved in the establishment of long-term memory are identified. It is noted that memory that lasts for years exceeds the half-life of proteins, and therefore depends on the growth of synaptic contacts. Further investigations are necessary to reveal whether the messengers initiating the formation of long-term memories are nuclear or cytoplasmic. M.S.K.

A87-11634
PRIMARY SEQUENCE OF A DIMERIC BACTERIAL HAEMOGLOBIN FROM VITREOSCILLA
S. WAKABAYASHI, H. MATSUBARA (Osaka University, Toyonaka, Japan), and D. A. WEBSTER Nature (ISSN 0028-0836), vol. 322, July 31, 1986, p. 481-483. refs
(Contract NSF INT-82-12086; NIH-GM-27085)

A87-11641
ULTRAFAST CAROTENOID TO PHEOPHORBIDE ENERGY TRANSFER IN A BIOMIMETIC MODEL FOR ANTENNA FUNCTION IN PHOTOSYNTHESIS
M. R. WASIELEWSKI (Argonne National Laboratory, IL), P. A. LIDDELL, D. BARRETT, T. A. MOORE, and D. GUST (Arizona State University, Tempe) Nature (ISSN 0028-0836), vol. 322, Aug. 7, 1986, p. 570-572. refs
(Contract W-31-109-ENG-38; DE-FG02-84CH-10198; NSF CHE-84-09644)

A87-11652
EFFECTS OF REGIONAL ALVEOLAR HYPOXIA AND HYPERCAPNIA ON SMALL PULMONARY VESSELS IN CATS
M. SHIRAI, K. SADA, and I. NINOMIYA (National Cardiovascular Center Research Institute, Suita, Japan) Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 440-448. Research supported by the Ministry of Health and Welfare of Japan. refs

An X-ray television system was employed to measure variations in the inner diameter of the small pulmonary arteries and veins and the flow velocities and volumes through them in response to regional alveolar hypoxia and hypercapnia. A total of 23 cats were chemically paralyzed so that a tube could be inserted into the left lower lobe main bronchus to control the oxygen content of the gas reaching their lungs. Arterial and atrial pressures were also monitored. Hypoxia and hypercapnia were found to cause a local vasoconstriction in the pulmonary arteries, which was accompanied by a decreased blood flow velocity and volumic flow in the lung areas monitored. M.S.K.

A87-11653
A NEW PHOTOMETRIC METHOD FOR OXYGEN CONSUMPTION MEASUREMENTS IN CELL SUSPENSIONS
W. MUELLER-KLIESER, R. ZANDER, and P. VAUPEL (Mainz, Universitaet, West Germany) Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 449-455. refs

A new method is described for reliably measuring O2 concentrations in suspensions of respiring cells. The cell suspension is equilibrated in a tonometer with a gas mixture of known composition and 500 microliter samples are withdrawn. The same syringe which withdraws the samples is used to inject 100 microliter samples into an elution chamber where dissolved O2 in the sample is transferred to a N2 gas stream for photometric analysis. The method, developed to study O2 concentrations in respiring tumor cells, can detect 0.1 microliter of O2 in a 100 microliter sample, and requires a 2-6 min analysis time. M.S.K.

A87-11656
LEARNED CONTROL OF HEART RATE DURING DYNAMIC EXERCISE IN NONHUMAN PRIMATES
M. I. TALAN (NIH, Gerontology Research Center, Bethesda, MD) and B. T. ENGEL (Francis Scott Key Medical Center, Baltimore, MD) Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 545-553. refs

A87-11657
ATROPINE - NO EFFECT ON EXERCISE MUSCLE HYPEREMIA IN CONSCIOUS RATS
R. B. ARMSTRONG (Georgia, University, Athens) and M. H. LAUGHLIN (Missouri, University, Columbia) Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 679-682. Research supported by the American Heart Association and Oral Roberts University. refs
(Contract NIH-AM-25472; NIH-HL-29428)

Rats performing treadmill trials were monitored to evaluate if cholinergic muscarinic receptors play a role in the control of muscle blood flow during the beginning of slow locomotory exercise. Previous studies had revealed a fast rise in blood flow in skeletal muscles with high populations of fast-twitch oxidative glycolytic fibers. It is also known that stimulation of sympathetic nerves in certain conditions causes vasodilation of skeletal muscle. The cholinergic role was measured by having saline control and atropinized rats exercise on treadmills. Blood flow distributions within and around muscles were monitored before, in the initial stages and during steady-state treadmill walking. No evidence was found for any significant role for the muscarinic cholinergic receptors in the elevation of blood flow during any phase of the exercise tests. M.S.K.

A87-11658
ELECTRICAL AND MECHANICAL ACTIVITY OF RESPIRATORY MUSCLES DURING HYPERCAPNIA
E. VAN LUNTEREN (Cleveland, University Hospitals, OH) and N. S. CHERNIACK (Case Western Reserve University, Cleveland, OH) Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 719-727. Research supported by the American Lung Association and Parker B. Francis Foundation. refs
(Contract NIH-HL-25830)

The relationships of the electrical activity and the lengths of the thoracic respiratory muscles to the mechanical load were examined experimentally using nine mongrel dogs as subjects. The dogs were anesthetized and BP sensors were inserted into the femoral arteries and veins. Length change data on the costal diaphragm and the parasternal intercostal muscles were collected with piezoelectric sonomicrometers implanted into surgically exposed muscle fibers. Valves placed in the airway permitted occluding inspiration on demand and forcing the animals to rebreath a 7 percent CO2-93 percent O2 mixture. A correlation was present between the costal and intercostal muscles during CO2 rebreathing. The correlation was significantly affected by complete occlusion of the airways for one breath. No quasi-isometric contractions were observed in any of the thoracic respiratory muscles during occlusion episodes. M.S.K.

A87-12798
CHANGES IN THE MEMBRANE PROTEINS OF RAT BRAIN STEM UNDER REM-SLEEP DEPRIVATION, AND THE DURATION OF THE REM PHASE DURING SUBSEQUENT UNRESTRAINED BEHAVIOR [IZMENENIIA MEMBRANNYKH BELKOV V STVOLE GOLOVNOGO MOZGA KRYS PRI LISHENII IKH PARADOKSAL'NOI FAZY SNA I PRODOLZHITEL'NOSTI' ETOI FAZY PRI POSLEDUIUSHCHEM SVOBODNOM POVEDENII]
N. N. DEMIN, E. P. SHELEPINA, L. N. NEROBKOVA, S. V. KRAPIVIN, and T. A. VORONINA (AN SSSR, Institut Fiziologii, Leningrad; AMN SSSR, Institut Farmakologii, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 72, June 1986, p. 723-728. In Russian. refs

A87-12799
ELECTRICAL INSTABILITY OF THE HEART IN ANIMALS WITH DIFFERENT RESISTANCE TO IMMOBILIZATION STRESS [ELEKTRICHESKAIA NESTABIL'NOST' SERDTSA U ZHIVOTNYKH S RAZLICHNOI USTOICHIVOST'IU K IMMOBILIZATSIONNOMU STRESSU]
A. M. BUNIATIAN (AMN SSSR, Nauchno-Issledovatel'skii Institut Normal'noi Fiziologii, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 72, June 1986, p. 757-762. In Russian. refs

A87-12800
THE EFFECT OF THE DELTA-SLEEP-INDUCING PEPTIDE ON THE CONDITION OF THE BRAIN MEMBRANES UNDER THE COLD STRESS [VLIIANIE PEPTIDA DELTA-SNA NA SOSTOIANIE MEMBRAN MOZGA PRI DEISTVII KHOLODOVOGO STRESSA]
A. A. KRICHEVSKAIA, T. I. BONDARENKO, E. IU. KRUPENNIKOVA, and I. I. MIKHALEVA (Rostovskii Gosudarstvennyi Universitet, Rostov-on-Don; AN SSSR, Institut Bioorganicheskoi Khimii, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 72, June 1986, p. 843-845. In Russian. refs

A87-12852
THE VIABILITY AND THE MUTABILITY OF PLANTS AFTER SPACE FLIGHT [ZHIZNESPOSOBNOST' I MUTABEL'NOST' RASTENII POSLE KOSMICHESKOGO POLETA]
E. N. VAULINA, I. D. ANIKEEVA, and L. N. KOSTINA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 5-11. In Russian. refs

The effect of space-flight conditions on the postflight viability, growth rate, and mutability of seeds and plants was investigated, using seeds and plants of Crepis capillaris and Arabidopsis thaliana carried aboard Salyut-6 and Salyut-7 Space Stations. Dry seeds, sprouts, and plants in different phases of development were examined after 49, 201, 226, 408, and 827 flight days, using seed germination, the frequency and the chromosomal aberration spectra in the root meristem, the rate of plant death at different growth stages, plant fertility, and the recessive mutation frequency as criteria of the viability mutability of the affected plants. The respective characteristics were compared with those of plants on the ground. The prolonged storage under both land and space conditions was found to decrease the germination ability, the survival rate, and the fertility, and to increase the number of mutations, but the effects of space storage were significantly more adverse. The effects of space flight are considered to be caused by the mutagenicity of cosmic rays as well as by the reduced chromosomal repair capacity. I.S.

A87-12853
THE EFFECT OF AUXIN ON THE MUTABILITY AND GROWTH ACTIVITY OF PLANTS AFTER EXPOSURE TO SPACE FLIGHT FACTORS [VLIIANIE AUKSINA NA MUTATSIONNUIU IZMENCHIVOST' I ROSTOVUIU AKTIVNOST' RASTENII POSLE DEISTVIIA FAKTOROV KOSMICHESKOGO POLETA]
U. K. ALEKPEROV, E. R. MEKHTI-ZADE, G. S. NECHITAILO, and D. N. NAGIEVA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 11-15. In Russian. refs

A87-12854
MODIFICATION BY ALPHA-TOCOPHEROL OF THE MUTATIONAL PROCESS IN THE SEEDS OF THE WELSH ONION SUBSEQUENT TO A PROLONGED SPACE FLIGHT [MODIFIKATSIIA ALPHA-TOKOFEROLOM MUTATSIONNOGO PROTSESSA V SEMENAKH LUKA-BATUNA, PERENESSHIKH DLITEL'NYI KOSMICHESKII POLET]
A. A. ALIEV, U. K. ALEKPEROV, A. L. MASHINSKII, I. T. ASKEROV, D. D. AKHUNDOVA et al. IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 15-19. In Russian. refs

The effect of alpha-tocopherol on cytogenic activity and mutability was studied in seedlings of Welsh onion after the dry seeds were flown aboard the Salyut-7 Space Station or stored on land. Subsequent to the 522-day flight, the seeds from the two batches were soaked either in water or in a 0.01 microgram/ml solution of alpha-tocopherol, and the seedlings were fixed 65 h later. Compared with the level of chromosomal aberrations found at the start of the experiment, the levels of aberrations in the root meristem of the seedlings grown in water from either land-aged or space-flight-aged seeds were found to be significantly elevated. On the other hand, in the seedlings grown in the tocopherol solution the numbers of aberrations were at the initial, prestorage, levels. In addition, alpha-tocopherol was found to stimulate the mitotic activity of all seeds. I.S.

A87-12855
STRUCTURAL-FUNCTIONAL CHARACTERISTICS OF FUNARIA HYGROMETRICA MOSS PROTONEMA CELLS UNDER PROLONGED ROTATION ON A CLINOSTAT [STRUKTURNO-FUNKTSIONAL'NAIA KHARAKTERISTIKA KLETOK PROTONEMY MKHA FUNARII VLAGOMERNOI PRI DLITEL'NOM KLINOSTATIROVANII]
E. M. NEDUKHA and I. I. OVRUTSKAIA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 19-23. In Russian. refs

A87-12856
ULTRASTRUCTURE OF THE ROOT CAP OF ARABIDOPSIS PLANTS UNDER NORMAL CONDITIONS AND UNDER HYPOGRAVITY [UL'TRASTRUKTURA KORNEVOGO CHEKHLIKA RASTENII ARABIDOPSISA V NORME I V USLOVIIAKH GIPOGRAVITATSII]
V. A. TARASENKO IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 23-29. In Russian. refs

Structural changes caused by hypogravity were observed, using TEM, in plants of Arabidopsis thaliana grown either in a horizontal clinostat (at 2 rpm) or aboard the Salyut-6 Space Station. Compared to the ground-grown controls, plants grown in the clinostat exhibited different distributions of the amyloplasts, smaller starch granules, an increase in vacuolation. These changes were intensified in the plants grown aboard the Space Station, which exhibited intensive vacuolation, an almost total absence of starch granules, and an appearance of zones of lysis in the cytoplasm and in cellular membranes. On the other hand, the mitotic processes in the root cap meristem were not affected. It is suggested that the observed structural changes in the space-grown plants were caused by the combined effects of weightlessness and the subsequent transfer to terrestrial gravity conditions. I.S.

A87-12857
MORPHOLOGICAL AND FUNCTIONAL STATE OF THE PHOTOSYNTHETIC APPARATUS OF PLANT CELLS CULTIVATED OVER DIFFERENT PERIODS OF TIME DURING A SPACE FLIGHT [MORFOLOGICHESKOE I FUNKTSIONAL'NOE SOSTOIANIE FOTOSINTETICHESKOGO APPARATA KLETOK RASTENII, RAZLICHNOE VREMIA KUL'TIVIRUEMYKH V USLOVIIAKH KOSMICHESKOGO POLETA]
Z. K. ABILOV, U. K. ALEKPEROV, A. L. MASHINSKII, S. N. FADEEVA, and A. A. ALIEV IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 29-32. In Russian.

A87-12858
EFFECT OF SPACE FLIGHT FACTORS ON CHLORELLA [VLIIANIE FAKTOROV KOSMICHESKOGO POLETA NA KHLORELLU]
N. K. SLASHCHEVA, E. N. VAULINA, and I. D. ANIKEEVA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 32-34. In Russian.

The viability, mutability, and dynamics of development of the LARG-1 strain of Chlorella vulgaris were studied after active and passive cultures were exposed to space flight conditions (by being seeded onto a nutrient medium during the flight) aboard the Salyut-6 station. Five days after landing, the cells were transferred to a fresh medium and were fixed at different stages of development. Compared to cultures flown in sealed ampules, used as controls, the Chlorella cultures exposed during the 18 days of flight showed similar survival and mutability characteristics. The dynamics of the development during the first and the second sporulations was also similar to that of controls for both active and passive cultures. An increase in microcolonies with visible irregularities was observed in a number of culture samples grown from both active and passive exposed cultures, indicating the presence of irregularities in cellular divisions. I.S.

A87-12859
QUALITATIVE ASSESSMENT OF SPECIFIC IMMUNOFLUORESCENCE IN PYRENOID AS A GIGANTIC CARBOXYSOME [OPYT KOLICHESTVENNOI OTSENKI SPETSIFICHESKOI IMMUNOFLUORESTSENTSII PIRENOIDA KAK GIGANTSKOI KARBOKSISOMY]
A. G. MARKELOVA, IU. M. SHAPIGUZOV, M. G. VLADIMIROVA, and V. E. SEMENENKO IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 35-41. In Russian. refs

The highly sensitive indirect immunofluorescence (IF) labeling technique of Vladimirova et al. (1982) was used to investigate the nature of the protein in pyrenoids of unicellular algae Dunaliella

salina and the CW-15 strain of Chlamydomonas reinhardii, using monospecific antiserum to ribodiphosphate (RDP) carboxylase of Chlorella. Both algal strains are known to grow without a cell wall, a condition which facilitated the penetration of the antibody molecules into the cell interior. The microscopic examination has disclosed the presence in pyrenoid bodies of significant amounts of RDP-carboxylase. Preliminary results of quantitative densitometric estimation of the RDP carboxylase are presented. I.S.

A87-12860
PROLONGED STORAGE OF UNICELLULAR ALGAE IN A COLLECTION WITHOUT PERIODIC RESEEDING [DLITEL'NOE KHRANENIE ODNOKLETOCHNYKH VODOROSLEI V KOLLEKTSII BEZ PERIODICHESKIKH PERESEVOV]
M. G. VLADIMIROVA, L. V. SALAMATOVA, E. D. LIUBIMOVA, and A. G. MARKELOVA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 41-53. In Russian. refs

Cells of 43 unicellular algae species, which included species of both mesophilic and thermophilic strains of Chlorella, were grown as slant agar cultures for periods of over 2 y under the conditions of constant temperature (10-12 C) and illumination (500-100 lux). The viability and pigment characteristics of parallel cultures, either stored under standard conditions, i.e., in test-tubes stoppered with cotton/cheesecloth plugs and reseeded periodically, or stored without transfer in test-tubes covered by a combination of a plug and a specially designed metal cap, were compared. It was found that the thermophilic strains stored in tubes covered by metal caps maintained viability without reseeding for up to 12 months, whereas the mesophilic strains could be stored in this way for 15-20 months. I.S.

A87-12861
COMPOUNDS OF STEROID NATURE IN UNICELLULAR ALGAE [SOEDINENIIA STEROIDNOI PRIRODY U ODNOKLETOCHNYKH VODOROSLEI]
G. L. KLIACHKO-GURVICH, M. I. TAUTS, and V. E. SEMENENKO IN: Microorganisms in artificial ecosystems . Novisibirsk, Izdatel'stvo Nauka, 1985, p. 53-61. In Russian. refs

Recent findings concerning the qualitative composition and contents of steroid-like compounds in algae belonging to different taxonomic groups are discussed. Attention is called to the fact that the algal steroids identified so far belong to the sterol type and that there is a correlation between the evolutionary stage of an alga plant and the molecular structure of its sterols. Experimental studies are presented in which steroid compounds extracted from Chlorella plants were tentatively identified by means of TLC, IR spectroscopy, GLC, and GLC-mass spectrometry methods. The results show the presence in Chlorella of terpenoids and steroids other than sterols. I.S.

A87-12862
ADAPTATION OF UNICELLULAR ALGAE AND TISSUE CULTURES OF HIGHER PLANTS TO HYPOGRAVITY CONDITIONS [OB ADAPTATSII ODNOKLETOCHNYKH VODOROSLEI I KUL'TUR TKANEI VYSSHIKH RASTENII K USLOVIIAM GIPOGRAVITATSII]
P. G. SIDORENKO, S. I. ZHADKO, A. F. POPOVA, I. M. KARNAUKH, and V. P. ILIN IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 61-66. In Russian.

Primary reactions of unicellular plants to hypogravity were studied by measuring chemoluminescence (CL) in Chlorella vulgaris and in cultured cells of Haplopappus gracilis subjected to either 5 or 50 rpm in a clinostat for periods ranging from 0.5 to 24 h. It was found that exposures to simulated hypogravity caused significant changes in the kinetics of the CL intensity spectra in both algal cultures. However, the changes were of wavelike character, with the amplitude of the CL intensity depending on the conditions of clinostatic rotation and the growth phase of the cells. The ability of the unicellular cultures to adapt to hypogravity indicates their potential usefulness for closed ecological systems I.S.

A87-12863
SUBMICROSCOPIC ORGANIZATION OF CHLORELLA CELLS GROWING FOR NINE DAYS ABOARD SALYUT-6 [SUBMIKROSKOPICHESKAIA ORGANIZATSIIA KLETOK KHLORELLY, RASTUSHCHIKH V TECHENII 9 SUT NA BORTU NOS 'SALIUT-6']
A. F. POPOVA, E. L. KORDIUM, and G. S. NECHITAILO IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 66-71. In Russian. refs

Cultures of the LARG-1 strain of Chlorella vulgaris were grown for nine days aboard Salyut-6, and the ultrastructural features and the developmental characteristics of the plant cells were examined after landing. The submicroscopic organization of cells exposed to the conditions of space flight did not differ significantly from the controls grown on land. The only differences were some vacuolation and slight variations of cytokinesis, as well as diminished contents of stored polysaccharides in space-grown cells. I.S.

A87-12864
THE EFFECT OF ILLUMINATION ON THE ANTIBACTERIAL ACTIVITY OF MICROALGAE [ZAVISIMOST' ANTIBAKTERIAL'NOI AKTIVNOSTI MIKROVODOROSLEI OT OSVESHCHENNOSTI]
I. V. MAKSIMOVA and O. A. SIDOROVA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 71-74. In Russian. refs

Changes in the bactericidal activity of Westella botryoides algae against B. oligonirophilus and P. fischeri bacteria were studied, using algae cultures at different stages of development, grown either in light or in the dark. It was found that the antibiotic activity in the algae-bacteria suspensions was maximal at the onset of the exponential growth phase and increased greatly upon exposure to light. The antibiotic compounds are released into the medium (i.e., the medium was active against bacteria separated from algae by a dialysis membrane) but are short-lived. The antibiotic substances were activated by light, and their activity was stronger against the gram-positive (B. oligonitrophilus) than the gram-negative (P. fischeri) bacteria. I.S.

A87-12865
THE EFFECT OF THE NITROGEN SOURCE IN THE GROWTH MEDIUM ON THE CARBOHYDRATE COMPOSITION OF CHLORELLA GROWN UNDER INTENSE CONTINUOUS CULTIVATION [VLIIANIE ISTOCHNIKA AZOTA V SREDE NA SOSTAV UGLEVODOV KHLORELLY PRI INTENSIVNOM NEPRERYVNOM KUL'TIVIROVANII]
E. L. NEFEDOVA and L. M. KRASOTCHENKO IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 82-84. In Russian.

A87-12866
COMPARISON OF THE CHARACTERISTICS OF ALGAL GROWTH IN WEIGHTLESSNESS USING LIVE AND FIXED BIOLOGICAL MATERIAL [SRAVNITEL'NAIA KHARAKTERISTIKA ROSTA VODOROSLEI V NEVESOMOSTI PO ZHIVOMU I FIKSIROVANNOMU BIOLOGICHESKOMU MATERIALU]
V. N. SYCHEV, T. B. GALKINA, E. M. KONDRATEVA, and T. G. GAVRISH IN: Microorganisms in artificial ecosystems . Novisibirsk, Izdatel'stvo Nauka, 1985, p. 85-87. In Russian.

A87-12867
THE EFFECT OF THE MAIN PHYSICAL CHARACTERISTICS OF THE NUTRIENT MEDIUM ON THE GROWTH RATE AND PHOTOSYNTHESIS OF CLOSTERIOPSIS ACICULARIS VAR. AFRICANA HIND. [IZUCHENIE ZAVISIMOSTI SKOROSTI ROSTA I FOTOSINTEZA CLOSTERIOPSIS ACICULARIS VAR. AFRICANA HIND. OT OSNOVNYKH FIZICHESKIKH FAKTOROV SREDY]
M. A. LEVINSKIKH, G. I. MELESHKO, and E. K. LEBEDEVA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 87-91. In Russian.

The effects of temperature, illumination, and atmospheric concentrations of CO2 and O2 on the rate of growth and development of Closteriopsis acicularis africana Hind. were studied using a continuously grown culture. The organism was shown to be thermophilic, with the temperature optimum for growth and photosynthetic activity in the 35-39 C range, the optimum for division being between 34 and 36 C. The alga is light-dependent and is resistant to the levels of light intensities far above its saturation level. The culture was also stable at high concentrations of CO2 and O2. The high resistance of this species to stressful conditions of growth in dense suspensions indicates that this organism is potentially suitable for intense cultivation in life-support systems. I.S.

A87-12868
GROWTH AND DEVELOPMENT OF ALGAE UNDER CUMULATIVE CULTIVATION AFTER EXPOSURE TO WEIGHTLESSNESS [ROST I RAZVITIE VODOROSLEI PRI NAKOPITEL'NOM KUL'TIVIROVANII IKH POSLE EKSPOZITSII V NEVESOMOSTI]
V. N. SYCHEV, T. B. GALKINA, E. M. KONDRATEVA, and L. M. KRASOTCHENKO IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 91-93. In Russian.

A87-12869
MINERAL NUTRITION OF DENSE POPULATIONS OF EUGLENA [MINERAL'NOE PITANIE PLOTNYKH POPULIATSII EVGLENY]
O. G. LIVANSKAIA and E. I. POKROVSKAIA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 93-95. In Russian.

A mineral medium has been developed which is suitable for growing Euglena under continuous cultivation in a nonflowing medium. The concentrations of minerals in the 'background medium' and the 'correcting solution' that have to be added periodically to the growing culture are also presented. The method of introducing the correcting solution is described. For cultivating Euglena in nonflowing media, the pH range of 3.5-5.5 is recommended, because it permits the use of ammonia in the correcting solution. I.S.

A87-12870
THE GAS EXCHANGE CHARACTERISTICS OF AN INTENSIVE CULTURE OF CLOSTERIOPSIS ACICULARIS VAR. AFRICANA HIND. [GAZOOBMENNYE KHARAKTERISTIKI INTENSIVNOI KUL'TURY CLOSTERIOPSIS ACICULARIS VAR. AFRICANA HIND.]
M. A. LEVINSKIKH IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 95, 96. In Russian.

The study of CO2/O2 exchange in a culture of a unicellular alga, Closteriopsis acicularis var. africana Hind., grown under intensive cultivation in a closed-atmosphere reactor is reported. A relationship was found between the increase of biomass, the volume of O2 produced, and the volume of absorbed CO2. Each of these characteristics can be used to regulate the basic growth parameters of the nutrient medium of algae grown under these conditions. I.S.

A87-12871
REGULATION OF CELLULAR SYNTHESIS OF RIBULOSE-1,5-DIPHOSPHATE CARBOXYLASE AND ITS SUBUNITS [REGULIATSIIA SINTEZA RIBULOZO-1,5-BISFOSFATKARBOKSILAZY I EE SUB'EDINITS V KLETKAKH]
T. I. KASATKINA, A. N. VEDENEEV, and V. E. SEMENENKO IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 97-102. In Russian. refs

The process of biosynthesis of ribulose diphosphate carboxylase (RDPC) molecule and its subunits was studied in Chlorella cultures, using the deoxy-D-glucose (2DG) to repress the enzyme synthesis. The contents of RDPC and of its subunits were analyzed, using immunoaffinity (for isolation) and immunofluorescence techniques, in the periods following the onsets of repression and induction (after withdrawal of the 2DG) stages. In the course of the repression stage, the protein contents of RDPC and of its large subunit, which is synthesized in the chloroplast, decreased by 60 and 40 percent, respectively. At the same time, the content of the small subunit, which is synthesized in the cell nucleus, was not affected. Removal of 2DG led to rapid recovery to the initial levels of the contents of large subunits and the RDPC. The observed discordance in the biosynthetic pattern of the large and small subunits contradicts the accepted view of the biosynthesis of RDPC, according to which the small subunit has the role the role of a direct inducer of the synthesis of the large subunit. I.S.

A87-12888
BACTERIA OF THE PSEUDOMONAS GENUS ISOLATED FROM THE ICE SHEET OF AN ANTARCTIC GLACIER [BAKTERII RODA PSEUDOMONAS IZ LEDNIKOVOI TOLSHCHI ANTARKTIDY]
T. A. SOROKINA and S. S. ABYZOV (AN SSSR, Institut Mikrobiologii, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), July-Aug. 1986, p. 494-504. In Russian. refs

Viable bacteria belonging to five different strains of the Pseudomonas genus were isolated from the mass of a glacier in central Antarctica: three from the horizontal layer at a depth of 79-81 m, and two from a depth of 91-92 m. The respective ages of the two ice layers are estimated to be 2100 and 2500 y. The results of characterization studies have shown that strains from different ice layers differed with respect to the optimal growth temperature, with only the two deeper deposited strains being psychrophilic. All strains were found to produce, in addition to a green fluorescent pigment, a melanin-like pigment, and their phenotypical characteristics were found to be similar (but not identical) to those of P. putida and P. aeruginosa species. It is considered that the two psychrophilic strains found at the depth of 91-92 m might be native to Antarctica, whereas the three other, mesophilic, strains might have been transported from moderate climate regions via air currents. I.S.

A87-12889
COMPARATIVE ASSESSMENT OF METHODS FOR STUDYING THE PHYSICAL WORK CAPACITY OF IRRADIATED ANIMALS [SRAVNITEL'NAIA OTSENKA METODOV ISSLEDOVANIIA FIZICHESKOI RABOTOSPOSOBNOSTI OBLUCHENNYKH ZHIVOTNYKH]
N. I. ARLASHCHENKO, D. IA. OPARINA, ZH. G. ADAMCHIK, and V. I. SHEIN (Institut Mediko-Biologicheskikh Problem, Moscow, USSR) Akademiia Nauk SSSR, Izvestiia, Seriia Biologicheskaia (ISSN 0002-3329), July-Aug. 1986, p. 577-583. In Russian. refs

Various methods for estimating work capacity in small animals are considered and assessed for their applicability to radiobiological studies. For the dose-related effect on work capacity, the tests that reveal all the physical resources of an organism (e.g., running on a treadmill to exhaustion, swimming to exhaustion, and the test of statistical endurance, estimated in rats as the time an animal can maintain itself on a vertical pole) are considered to be most adequate. When estimating the activity of irradiated animals, the method of Birren and Kay (1958), which measures the swimming speed over a limited distance, is considered to be the test of

choice. The method reflects the animal's functional state at a given time after irradiation. I.S.

A87-12918
ADAPTATION OF HUMANS AND ANIMALS TO EXTREME ENVIRONMENTAL CONDITIONS [ADAPTATSIIA CHELOVEKA I ZHIVOTNYKH K EKSTREMAL'NYM USLOVIIAM VNESHNEI SREDY]
N. A. AGADZHANIAN, ED. Moscow, Izdatel'stvo Universiteta Druzhby Narodov, 1985, 184 p. In Russian. For individual items see A87-12919 to A87-12925.

The theoretical aspects and experimental observations concerning adaptation on different levels of biological organization are presented, with special attention given to human adaptation to extreme environmental conditions. Papers are presented on the physiological mechanisms of adaptation to hypoxia, the corticofugal effects on the reticular formation and the cardiac rhythm, the morphofunctional indices of animals individual resistance to hypoxia, the regulatory features of the cardiorespiratory system in humans during adaptation to hot climate, the thermoregulatory characteristics of natives of different climatic-geographical regions during adaptation to moderate climate, and the functions of the human organism during prolonged stay and work in the extreme conditions of caves. In addition, the aspects of adaptation and biorhythm are discussed. I.S.

A87-12919
THE PHYSIOLOGICAL MECHANISMS OF ADAPTATION TO HYPOXIA [FIZIOLOGICHESKIE MEKHANIZMY ADAPTATSII K GIPOKSII]
A. A. BASHKIROV IN: Adaptation of humans and animals to extreme environmental conditions . Moscow, Izdatel'stvo Universiteta Druzhby Narodov, 1985, p. 10-28. In Russian. refs

Adaptive reactions to hypoxia were studied in rats subjected to simulated altitudes of 10,000 and 11,000 m. The time of survival (determined by the time of the onset of spasmodic breathing), the general condition of the animals, and various physiological parameters were monitored in animals of various ages (for studies of the ontogeny-related effects) which were subjected to repeated exposures to hypoxic conditions. In addition, the diurnal variations in the survival time of animals subjected to hypoxia and hypecapnia were studied during three seasons (spring, summer, and fall) in intact animals and in animals injected with lethal doses of miorelaxin. The results are discussed with reference to the mechanisms responsible for the maintenance of the oxygen homeostatis. I.S.

A87-12920
CORTICOFUGAL EFFECTS ON THE RETICULAR FORMATION AND HEART RHYTHM [KORTIKOFUGAL'NYE VLIIANIIA NA RETIKULIARNUIU FORMATSIIU I RITM SERDTSA]
L. K. SHCHELTSYN IN: Adaptation of humans and animals to extreme environmental conditions . Moscow, Izdatel'stvo Universiteta Druzhby Narodov, 1985, p. 28-56. In Russian. refs

Two problems are examined: (1) the effect of the functional condition of the cerebral cortex on changes in the heart rhythm under hypoxia and hypercapnia; and (2) the participation of corticofugal effects in the generation of evoked potentials of the bulbar reticular formation, whose activity is directly involved in the regulation of the cardiovascular system. Experimental data indicate a close functional connection between the cerebral cortex and the bulbar reticular formation. B.J.

A87-12921
MORPHOFUNCTIONAL INDICES OF ANIMALS' INDIVIDUAL RESISTANCE TO HYPOXIA [MORFOFUNKTSIONAL'NYE POKAZATELI INDIVIDUAL'NOI USTOICHIVOSTI ZHIVOTNYKH K GIPOKSII]
S. S. ALEKSANDROVA, L. V. SHEVCHENKO, and A. I. ELFIMOV IN: Adaptation of humans and animals to extreme environmental conditions . Moscow, Izdatel'stvo Universiteta Druzhby Narodov, 1985, p. 57-82. In Russian. refs

The dynamic changes effected by adaptation to high altitude in the neuronal cytoplasmic contents of RNA and protein in various brain structures, and changes observed in the acid-base and coagulatory indices were studied in rats with different levels of individual resistance to hypoxia. Prior to the high altitude training, the animals were divided into groups of high, medium, and low resistance on the basis of their reaction to simulated 11,000-m altitude. Half of the rats from every group were then subjected to daily 8-h-long periods at 5000-m altitude (with the control rats maintained at sea level). The histologically determined levels of cytoplasmic densities of RNA and protein in the neurons of cerebral and cerebellar cortices and in the reticular formation were correlated with the changes observed in the acid-base and blood coagulatory indices. The results have indicated that the altitude-effected changes in the RNA/protein ratio and the acid-base and coagulation indices were characteristic for the given resistance. I.S.

A87-12925
ADAPTATION AND BIORHYTHMS [ADAPTATSIIA I BIORITMY]
N. A. AGADZHANIAN, I. G. VLASOVA, and A. M. ALPATOV IN: Adaptation of humans and animals to extreme environmental conditions . Moscow, Izdatel'stvo Universiteta Druzhby Narodov, 1985, p. 138-184. In Russian. refs

The effects of hypothermia and hyperthermia on circadian rhythms in the activity of cerebellar neurons were studied experimentally, using thin (300-400 micron) sections of mice cerebellums maintained in a salt medium for up to 24 hours. The impulse activity, measured by means of electrodes placed within the Purkinje cell layer, was recorded for different intervals within the 24-h periods in studies performed during the summer and the winter seasons. The results indicate the endogenic character of the cerebellar biorhythms, governed by cellular and/or subcellular level mechanisms, with both circadian and seasonal variations. Both hypothermia and hyperthermia have caused phase shifts in the cerebellar impulse activity, with circadian variations and seasonal variations in the sensitivity to both conditions. I.S.

N87-10686# Institute of Biomedical Problems, Moscow (USSR).
FUNCTIONS OF SKELETAL MUSCLES OF RATS AND MONKEYS AFTER 5-DAY SPACE FLIGHT (ON COSMOS 1514)
V. S. OGANOV, A. S. RAKHMANOV, S. A. SKURATOVA, M. A. SHIRVINSKAYA, and V. S. MAGEDOV *In* ESA Proceedings of 2nd International Conference on Space Physiology p 89-93 Feb. 1986
Avail: NTIS HC A12/MF A01

Contractile properties of skeletal muscles were investigated using glycerinated myofibers of pregnant rats. The soleus muscle of a rhesus monkey was examined using electromyograms and mechanograms of leg movements recorded in vivo. It is found that the contraction strength of myofibers of predominantly postural muscles of rats decrease. The decline of the electromechanical efficiency of the monkey soleus muscle can also be associated with a decrease of strength properties of motor units. It is assumed that mechanisms of regulation of muscle contraction in rats and monkeys may change at early flight stages. It is also assumed that the response of the monkey soleus muscle at that stage may reflect changes in the central components of movement coordination. ESA

N87-10687# Centre National de la Recherche Scientifique, Lyon (France). Lab. de Physiologie.
HINDLIMB SUSPENSION EFFECTS ON RAT SKELETAL MUSCLE RESPONSE
D. DESPLANCHES, M. H. MAYET, B. SEMPORE, M. GRANDMONTAGNE, J. FRUTOSO, and R. FLANDROIS *In* ESA Proceedings of 2nd International Conference on Space Physiology p 95-98 Feb. 1986
Avail: NTIS HC A12/MF A01

The effects of hindlimb tail suspension on histochemical and biochemical properties of rat skeletal muscle were evaluated. Five weeks of suspension result in a significant atrophy (60% and 19%) in soleus (SOL) and extensor digitorum longus (EDL) respectively. The myosine ATPase method reveals a significant change in fiber repartition with an increase of intermediate fiber subgroups (IAB, IB in soleus, IIAB in EDL). Citrate synthase and 3 hydroxyacyl CoA dehydrogenase activities decrease significantly in SOL but are not affected in EDL. Lactate dehydrogenase activity is unchanged in SOL and EDL. It appears that muscle response to hindlimb suspension is greater in slow twitch muscle than in fast twitch ones. ESA

N87-10704# National Aeronautics and Space Administration, Washington, D.C.
ANIMAL STUDIES ON SPACELAB-3
C. SCHATTE, R. GRINDELAND, P. CALLAHAN, W. BERRY, G. FUNK (Management and Technical Services Co., Philadelphia, Pa.), and W. LENCKI *In* ESA Proceedings of 2nd International Conference on Space Physiology p 233-244 Feb. 1986 Previously announced as N86-16889
Avail: NTIS HC A12/MF A01

Two squirrel monkeys and 24 rats were flown on Spacelab-3 to provide hands-on maintenance of animals in a laboratory environment. With few exceptions, the animals grew and behaved normally, were free of chronic stress, and differed from ground controls only for gravity-dependent parameters. One of the monkeys exhibited symptoms of space sickness similar to those observed in humans, which suggests squirrel monkeys may be good models for studying the space-adaptation syndrome. Among parameters measured in the rats, most notable is the dramatic loss of muscle mass and increased fragility of long bones. Other rat findings include suppressed interferon production by spleen cells, defective release of growth hormone by somatrophs, possible dissociation of circadian pacemakers, changes in hepatic lipid and carbohydrate metabolism, and hypersensitivity of marrow cells to erythropoietin. ESA

N87-10705# Centre d'Etudes et de Recherches de Medecine Aeronautique, Paris (France).
ANIMAL MODELS IN SPACE PHYSIOLOGY [MODELES ANIMAUX EN PHYSIOLOGIE SPATIALE]
C. L. MILHAUD *In* ESA Proceedings of 2nd International Conference on Space Physiology p 203-209 Feb. 1986 In FRENCH
Avail: NTIS HC A12/MF A01

The moral, scientific, and operational reasons for animal experiments in space physiology are reviewed. Choice of animal is discussed. Bioinstrumentation and weightlessness simulation facilities are described. Space flight experiment design is considered. ESA

N87-10706# Centre d'Etudes et de Recherches de Medecine Aeronautique, Paris (France).
CONTRIBUTION OF ANIMAL MODELS TO THE INVESTIGATION OF BONE CHANGES IN WEIGHTLESSNESS
C. NOGUES, C. MILHAUD, P. PESQUIES, and V. S. OGANOV (Institute of Biomedical Problems, Moscow, USSR) *In* ESA Proceedings of 2nd International Conference on Space Physiology p 211-215 Feb. 1986
Avail: NTIS HC A12/MF A01

Bone change space flight results obtained on rats and on a rhesus monkey are compared with those obtained in bedresting primates or hypokinetic rats. A change in cell systems responsible for bone remodeling is revealed by the morphometric method. Bed rest produces stress in the monkey and is not recommended. Hypokinesis can be used with rats. ESA

N87-10707# Centre d'Etudes et de Recherches de Medecine Aeronautique, Paris (France).
COSMOS 1514 FLIGHT: STUDY OF RHESUS MONKEY ECG
R. BLOSTIN, C. MILHAUD, B. CAILLER, P. PESQUIES, V. MELNITCHENKO (Institute of Biomedical Problems, Moscow, USSR), B. KULAEV, V. MAGEDOC, and G. TCHAMURLIEV *In* ESA Proceedings of 2nd International Conference on Space Physiology p 217-223 Feb. 1986
Avail: NTIS HC A12/MF A01

The electrocardiogram of 2 rhesus monkeys flown aboard Cosmos 1514 satellite (9 day flight) was analyzed in order to monitor the animals' health, and evaluate the validity of the rhesus monkey in cardiovascular physiology in space. The analysis of morphology long and short term changes in heart rate suggests that no serious pathological phenomenon occurred during flight. The neurovegetative reactivity of the rhesus model in space seems close to man's. ESA

N87-10708# Institute of Biomedical Problems, Moscow (USSR).
THE STATE OF BONES OF PREGNANT RATS DURING AN ACUTE STAGE OF ADAPTATION TO WEIGHTLESSNESS
A. V. BAKULIN, E. A. ILYAN, V. S. OGANOV, and V. I. LEBEDEV *In* ESA Proceedings of 2nd International Conference on Space Physiology p 225-228 Feb. 1986
Avail: NTIS HC A12/MF A01

Integrated mineralization parameters, biomechanical characteristics and elemental composition of spongy bones of the proximal epiphysis of the humerus in pregnant rats flown on Cosmos-1514 for 5 days were investigated. Results suggest that bone resorption is activated but does not lead to noticeable osteoporosis, probably due to the short flight duration, but could produce bone destructuring accompanied by deterioration of bone mechanical properties. This is paralleled by physico-chemical changes in the mineral component, responsible for a decline of the strength parameters of bones with their density remaining unaltered. It is suggested that bone variations in the weightless state may develop in a phaselike manner. ESA

N87-11478*# Management and Technical Services Co., Washington, D.C.
USSR SPACE LIFE SCIENCES DIGEST, ISSUE 8
L. R. HOOKE, ed., M. RADTKE, ed., V. GARSHNEK, ed., R. TEETER, ed., and J. E. ROWE, ed. (Library of Congress, Washington, D. C.) Oct. 1985 111 p
(Contract NASW-3676)
(NASA-CR-3922(09); NAS 1.26:3922(09)) Avail: NTIS HC A06/MF A01 CSCL 06C

This is the eighth issue of NASA's USSR Space Life Sciences Digest. It contains abstracts of 48 papers recently published in Russian language periodicals and bound collections and of 10 new Soviet monographs. Selected abstracts are illustrated with figures and tables. Additional features include reviews of two Russian books on radiobiology and a description of the latest meeting of an international working group on remote sensing of the Earth. Information about English translations of Soviet materials available to readers is provided. The topics covered in this issue have been identified as relevant to 33 areas of aerospace medicine and space biology. These areas are: adaptation, biological rhythms, biospherics, body fluids, botany, cardiovascular and respiratory systems, cosmonaut training, cytology, endocrinology, enzymology, equipment and instrumentation, exobiology, gastrointestinal system, genetics, group dynamics, habitability and environment effects, hematology, human performance, immunology, life support systems, man-machine systems, mathematical modeling, metabolism, microbiology, musculoskeletal system, neurophysiology, nutrition, operational medicine, personnel selection, psychology, reproductive biology, and space biology and medicine. Author

N87-11479# Washington Univ., Seattle. Bioelectromagnetics Research Lab.
EFFECTS OF LONG-TERM RADIOFREQUENCY RADIATION ON IMMUNOLOGICAL COMPETENCE AND METABOLISM Final Report, Jun. 1983 - Oct. 1985
C. K. CHOU, J. A. CLAGETT, L. L. KUNZ, and A. W. GUY May 1986 118 p
(Contract F33615-83-C-0620)
(AD-A169064; USAFSAM-TR-85-105) Avail: NTIS HC A06/MF A01 CSCL 06R

Two groups of 20 rats were exposed 21 h/day for 6 and 12 mo, respectively, to 10-microsecond-pulsed 2450-MHz microwaves at 800 pps and 8-Hz modulation, at an average power density of .48 mW/sq. cm (SAR 0.15-0.4 W/kg) in circularly polarized waveguides. Equal numbers of rats were sham exposed. Effects seen in the previous study (elevated corticosterone level afer 6 wk exposure; increased B and T cells in rats at 13 mo exposure) were not replicated in this study. Quantitative immunological tests involving 70 parameters showed six different showed six different effects. Among them, increased hematopoietic progenitor cells in the marrow was the only consistent effect in both 6- and 12-mo exposed groups. In the second part of the study three groups of rats were exposed 21 h/day to 2450-MHz CW microwaves at an average SAR of 0, 2.5, 5, and 7.5 W/kg (10 rats each) under three environmental temperatures (17.8, 22.2, and 26.7 C) over three 6-wk periods. Metabolism--including body mass, food/water intake, oxygen consumption, and carbon dioxide production--was measured, and health profile and immunological response were monitored. Results show that the effects are highly dependent on exposure level and environmental temperature. GRA

N87-11480# Brookhaven National Lab., Upton, N. Y.
ANAEROBIC MICROBIAL TRANSFORMATIONS IN SUBSURFACE ENVIRONMENTS: HIGHLIGHTS
A. J. FRANCIS Sep. 1985 15 p
(Contract DE-AC02-76CH-00016)
(DE86-008703; DOE/ER-0243) Avail: NTIS HC A02/MF A01

Anaerobic microorganisms under appropriate conditions affect trace metal dissolution and mobilization or immobilization in the subsurface environments by one or more of the following processes: (1) changes in pH and Eh (which affect the valence or ionic state of the metals and enhance their mobility in the subsurface environment by retarding the subsoil binding characteristics); (2) chelation or production of specific sequestering agents (solubilization and leaching of certain elements by microbial metabolites or decomposition products); and (3) bioaccumulation and release of metals due to remineralization elsewhere in the environment. DOE

52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

A87-10562
THE ROLE OF VAGAL TONUS IN SLIGHT ATRIOVENTRICULAR BLOCKS IN PILOTS [ROLE DU TONUS VAGAL DANS LES BLOCS AURICULO-VENTRICULAIRES DE FAIBLE DEGRE DE L'AVIATEUR]
G. LEGUAY, P. BRUNEL, A. SEIGNEURIC, J. P. BURLATON, and J. P. GOURBAT Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 101-110. In French. refs

The long-term impact of slight vagal tonus in military pilots was studied by means of 9 yr of clinical monitoring of the progress of the condition in 22 aviation personnel. Tests were periodically performed to collect ECG, stress ECG, blood, urine and electrolyte, and thoracic radiographic data. Comparisons were made between the results for air personnel and data from athletes to evaluate the effects of physical fitness on the condition. No clear indication was derived regarding the effect of slight A-V blocks on flight safety. Several tests are recommended for use in monitoring pilots for early detection of the onset of severe A-V blocks, and for considering the physical condition observed in the light of the person's age, professional experience and the type of flight assignment. M.S.K.

A87-10564
EXERCISE-BASED THALLIUM MYOCARDIAL TOMOGRAPHY FOR DIAGNOSING CORONARY INSUFFICIENCY - OF INTEREST FOR EXPERTISE WITH FLIGHT PERSONNEL [LA TOMOSCINTIGRAPHIE DU MYOCARDE AU THALLIUM A L'EFFORT POUR LE DIAGNOSTIC D'INSUFFISANCE CORONAIRE - INTERET DANS L'EXPERTISE DU PERSONNEL NAVIGANT]
G. KARCHER, M. AMOR, A. ABERTRAND, and A. BALAUD (Hopital de Brabois, Vandoeuvre-les-Nancy, France) Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 118-124. In French. refs

A87-10565
SICKLE CELL DISEASE AND FLIGHT PERSONNEL [DREPANOCYTOSE ET PERSONNEL NAVIGANT DE L'AERONAUTIQUE]
A. DIDIER, J. BILL, D. BOURGET, and J. C. CASCELLIO (Centre Principal d'Expertise du Personnel Navigant, Paris, France) Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 124-129. In French. refs

Long-term clinical monitoring was performed of 115 flight personnel who were carriers of sickle cell disease (SCD) and 40 who were not to evaluate the impact of the disease on flight safety. The number of carriers, among all personnel tested, indicated that 7.7 percent of the population studied carried the SCD. No significant clinical differences were detected between the carriers and the control group. However, a literature review indicates that some symptoms, e.g., anemia, which are latent in carriers of SCD can become acute in stressful flight conditions such as takeoff and landing, in severe thermal changes and accelerations etc. It is therefore recommended that carriers be refused certification of fitness for military flight duty. Commercial pilots, facing less stressful conditions, may be permitted to fly. M.S.K.

A87-10566
MALIGNANT MELANOMAS AND FLIGHT FITNESS [MELANOMES MALINS ET APTITUDE AU PERSONNEL NAVIGANT]
Y. ROUGIER (Hopital d'Instruction des Armees Val-de-Grace, Paris, France), J. M. SONNECK, A. SEIGNEURIC, A. DIDIER (Service de Sante pour l'Armee de l'Air, Ecole d'Application, Paris, France), J. P. GOURBAT (Hopital d'Instruction des Armees Dominique Larrey, Versailles, France) et al. Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 130-134. In French. refs

The existing database on malignant melanomas (MM) was examined to formulate criteria on which to certify or refuse certification of flight fitness. A study by Clark (1969), which covered several types of cutaneous MMs, provided statistical estimates of the expected life span of persons afflicted with MMs. Comparisons are made with the thickness of the recorded tumors and the survival rates. The data indicate that MMs under 0.5 mm should not be an impediment to flight fitness, while tumors over 2.0 mm thick would disqualify a person for flight duty. Personnel with tumors 0.50-2.0 mm thick must be evaluated clinically for the location of the tumor, the presence of other malignancies, the change of cerebral metastasis. Personnel who are allowed to fly with MMs must undergo rigorous clinical examinations three times a year. M.S.K.

A87-10568
THE RIGHT VENTRICLE AND SUSTAINED, INTENSE +GZ ACCELERATIONS [COEUR DROIT ET ACCELERATIONS +GZ SOUTENUES ET DE HAUT NIVEAU]
P. BORREDON, F. PAILLARD, P. LISCIA, B. CAILLER (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris, France), H. ILLE (Centre Principal d'Expertise Medicale du Personnel Navigant, Paris, France) et al. Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 139-144. In French. refs
(Contract DRET-84-1046)

Pressure transducers were placed in the right and left ventricles of the heart of a baboon who then underwent centrifuge tests to examine the effects of intense acceleration on the heart. The baboon was exposed to an acceleration of 7 Gz for 23 sec. The right and left ventricular pressures (RVP and LVP) were 18 mm Hg and 116 mm Hg, respectively, before acceleration. During the plateau of acceleration the RVP reached 70 mm Hg while LVP increased to only 120 mm Hg. At the end of the acceleration period the RVP decreased and the LVP had increased to the 150 mm Hg maximum value. The data explain a previously observed right ventricular dilation in fighter pilots that has not been observed in pilots of transport aircraft. M.S.K.

A87-10569
EXERCISE ECHOCARDIOGRAPHY - POTENTIAL APPLICATION FOR MONITORING THE HEARTS OF COSMONAUTS DURING LONG DURATION MISSIONS [L'ECHOCARDIOGRAPHIE D'EFFORT - APPLICATION POTENTIELLE A L'ETUDE DU COEUR DES COSMONAUTES AU COURS DE VOLS DE LONGUE DUREE]
R. BRION, J. OLLIVIER, J. DRONIOU (Hopital d'Instruction des Armees Val-de-Grace, Paris, France), A. DIDIER (Centre Principal d'Expertise Medicale du Personnel Navigant, Paris, France), and B. WARME-JANVILLE Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 145-147. In French. refs

Preliminary results are reported from attempts to develop an exercise echocardiographic method of monitoring the myocardial functioning, i.e., the contractile reserve capacity, of the hearts of personnel in long duration microgravity spaceflight. The technique is aimed at the left ventricular function. Data acquisition requires maintaining the probe in a fixed orientation relative to the thorax of the subject. A portable device has been developed which has been affixed to a table in front of a subject pedalling on an ergometer. An accurate probe angle was obtained with the probe on an adjustable arm, indicating that further adaptation of the device could permit accurate monitoring of the myocardial functioning of personnel during long space missions. M.S.K.

A87-10571
MECHANICAL SOLID VIBRATIONS. II - LOW AND HIGH FREQUENCY VIBRATIONS [LES VIBRATIONS MECANIQUES SOLIDIENNES. II - LES VIBRATIONS DE BASSE FREQUENCE LES VIBRATIONS DE HAUTE FREQUENCE]
J. L. POIRIER (Centre d'Essais en Vol, Bretigny-sur-Orge, France) Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 153-161. In French.

The sources and types of low and high frequency vibrations that affect the human body in moving vehicles, especially in land vehicles or in aircraft, are characterized, along with the effects on various parts of the body. Of particular interest is the frequency of the vibrations, which determines whether the body will act as a unit mass or as a series of connected masses. Typical vibratory rates of various vehicles are reviewed, along with the database on their effects on muscular activity, cardiovascular functioning, vision, breathing and the spine. Techniques are described for measuring the accelerations, the associated displacements of parts of the body, and noting symptoms of damage. The responses of the body are typified by discussing clinical data from helicopter pilots. M.S.K.

A87-10572
NUTRITION AND SUSTAINED PHYSICAL ACTIVITIES - SURVIVAL SITUATIONS [NUTRITION ET ACTIVITES PHYSIQUES SOUTENUES - APPLICATION AUX SITUATIONS DE SURVIE]
C. Y. GUEZENNEC, P. SATABIN, B. SERRURIER, and P. C. PESQUIES (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris, France) Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 162-167. In French. refs

The nutritional needs of flight personnel in survival situations are assessed. The nutritional requirements will vary from person to person on the basis of sex, age, weight, physical condition, the level of physical activity, and the exterior thermal conditions. A range of caloric consumptions are defined for various levels of physical activity. Sources of glucides, lipids, proteins and vitamins can meet the energy demands of a body are identified, along with their assimilation and consumption pathways in the body. Flight personnel in normal conditions are noted to function well on a diet equivalent to that of the general population. A cold survival situation may increase the caloric needs by a factor of three or four, demands which can be met by consuming considerable amounts of greasy foods. M.S.K.

A87-10573
THE RESPIRATORY APPARATUS IN AERONAUTICAL AND SPACE MEDICINE [L'APPAREIL RESPIRATOIRE EN MEDECINE AERONAUTIQUE ET SPATIALE]
G. LEGUAY and A. SEIGNEURIC (Hopital d'Instruction des Armees Dominique Larrey, Versailles, France) Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 168-174. In French. refs

Most cells of the human respiratory system reside in an atmosphere very close to that at sea level, a situation which can be extremely altered by conditions which occur in aircraft and spaceflight. Dysfunctions such as hypoxia, hyperventilation, embolisms, swelling with decreased gas pressure, and the bends can occur. Furthermore, pilots can experience explosive decompressions and strong accelerations. The clinical database on measurable symptoms which accompany the debilities associated with the severe atmospheric changes which can occur in flight is summarized, with particular note made of cardio-pulmonary effects. Finally, the atmospheric conditions which have been selected for U.S. and Soviet long-duration space missions are described. M.S.K.

A87-11134
WOMEN'S G TOLERANCE
K. K. GILLINGHAM, C. M. SCHADE, W. G. JACKSON, and L. C. GILSTRAP (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, Aug. 1986, p. 745-753. refs

G tolerances of 102 women and 139 men subjected to Standard Medical Evaluation (Medeval) G Profiles were compared. Unpaired t-tests revealed no significant difference between the women and men in either relaxed or straining G tolerance. Covariance analysis controlling for differences in tolerance due to age, height, weight, and activity status revealed the women to have marginally lower tolerance; the analysis also identified height as a factor having a strong negative influence on G tolerance, and weight as having a positive influence. When the women were matched only by height to the men in the comparison group, the women's mean G tolerances were significantly lower than the men's. On Standard Training G Profiles 88 percent of 24 women and 80 percent of 213 men completed the runs, but this difference was not significant. G tolerances of 47 women were measured on the Medeval Profiles both during and between menses, but no significant differences related to menstruation were found. No important differences between women and men in signs or symptoms of G stress were observed, except for two instances of urinary stress incontinence in women during the Training Profiles. It is concluded that women should not categorically be excluded from aircrew duties for reasons of G intolerance. Author

A87-11136* Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
VALIDATION AND APPLICATION OF SINGLE BREATH CARDIAC OUTPUT DETERMINATIONS IN MAN
J. A. LOEPPKY, E. R. FLETCHER, L. G. MYHRE, and U. C. LUFT (Lovelace Foundation for Medical Education and Research, Albuquerque, NM) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, Aug. 1986, p. 759-768. refs
(Contract NAS9-12572)

The results of a procedure for estimating cardiac output by a single-breath technique (Qsb), obtained in healthy males during supine rest and during exercise on a bicycle ergometer, were compared with the results on cardiac output obtained by the direct Fick method (QF). The single breath maneuver consisted of a slow exhalation to near residual volume following an inspiration somewhat deeper than normal. The Qsb calculations incorporated an equation of the CO2 dissociation curve and a 'moving spline' sequential curve-fitting technique to calculate the instantaneous R from points on the original expirogram. The resulting linear regression equation indicated a 24-percent underestimation of QF by the Qsb technique. After applying a correction, the Qsb-QF relationship was improved. A subsequent study during upright rest and exercise to 80 percent of VO2(max) in 6 subjects indicated a close linear relationship between Qsb and VO2 for all 95 values obtained, with slope and intercept close to those in published studies in which invasive cardiac output measurements were used. I.S.

A87-11138
THE EFFECT OF SPIRONOLACTONE ON THE CARDIOCIRCULATORY RESPONSES TO UPRIGHT TILT AT SEA LEVEL AND AT SIMULATED HIGH ALTITUDE
C. S. FULCO, R. LARSEN, P. B. ROCK, A. J. YOUNG, and A. CYMERMAN (U.S. Army, Altitude Research Div., Natick, MA) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, Aug. 1986, p. 787-791. refs

The effect of spironolactone (S) on the cardiocirculatory responses to upright tilt at sea level (SL) and at a simulated altitude of 4600 m was investigated. Heart rate, stroke volume, cardiac output, calf blood flow, total peripheral resistance, and systemic blood pressure were measured during supine rest and after 10 min of a 60-deg head-up tilt, using an impedance monitor and an electrosphygmomanometer. The 24-h determinations of urinary volume, sodium and potassium, and venous plasma values for N, K, and Cl were obtained daily. There were no statistically significant differences between placebo and S treatment in the values of an y of the measured parameters obtained for either the supine or the upright positions at SL or at 4600 m. It is concluded that S did not induce a significant diuresis or alter vascular responsiveness enough to affect the normal cardiocirculatory responses to upright tilt at SL or the high altitude. I.S.

A87-11651
FATIGUE OF INTERMITTENT SUBMAXIMAL VOLUNTARY CONTRACTIONS CENTRAL AND PERIPHERAL FACTORS
B. BIGLAND-RITCHIE, F. FURBUSH, and J. J. WOODS (John B. Pierce Foundation Laboratory, New Haven; Quinnipiac College, Hamden, CT) Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 421-429. refs
(Contract PHS-NS-14756; PHS-HL-30026)

Results are reported from a study of the decline of maximal voluntary force-generating capacity (MVC) of the quadriceps, soleus and adductor pollicis muscles of humans during fatiguing isometric exercises. Ten subjects performed sequences of 3-5 sec contractions of the muscles. Electrical pulses which elicited twitches were fed to the muscles being tested before, one second into and one second after the contractions. The techniques used to measure the MVCs of the muscles are detailed. The soleus was found to resist fatigue for as much as seven times as long as the quadriceps. The central nervous system could still transmit activation messages to the quadriceps and adductor pollicis muscles after prolonged fatigue tests. M.S.K.

A87-11654
CONTROL OF VENTILATION IN EXTREME-ALTITUDE CLIMBERS
S. MASUYAMA, H. KIMURA, T. SUGITA, T. KURIYAMA, K. TATSUMI (Chiba University, Japan) et al. Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 500-506. refs

A87-11655
EFFECT OF HYPEROXIA ON SUBSTRATE UTILIZATION DURING INTENSE SUBMAXIMAL EXERCISE
R. P. ADAMS, P. A. CASHMAN, and J. C. YOUNG (Boston University, MA) Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 523-529. refs

Results are presented from an experimental study of the metabolic effects experienced by humans exercising in hyperoxic conditions. Six male subjects performed ergometer trials while being monitored for maximum O2 uptake. The subjects wore masks through which flowed either normal or hyperoxic air mixtures. Blood and respiratory samples were taken at intervals during the trials and were analyzed with the BMDP statistical package. The results indicated that a substrate shift occurred in the hyperoxic conditions, i.e., the oxidation of cell fat increased and glycolysis was depressed. M.S.K.

A87-11659
RESPIRATORY MECHANICS IN MEN FOLLOWING A DEEP AIR DIVE
P. W. CATRON, J. BERTONCINI, R. P. LAYTON, M. E. BRADLEY, and E. T. FLYNN, JR. (U.S. Navy, Hyperbaric Medicine Program Center, Bethesda, MD) Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 734-740. Navy-supported research. refs

The mechanical characteristics of the lung functions of 10 male subjects were studied before and after simulated deep dives. The tests were performed in a pressure chamber to mimic dives to 285 ft depth. Measurements were taken of the pulmonary resistance, the inspiratory capacity and expiratory reserve volume, the quasistatic lung compliance, flow volume curves, transpulmonary pressure, airflow and volume, and respiratory rates. Precordial Doppler recordings were also made for each diver. The pressure dives caused bubbles to form in the lungs of four divers, and two of the divers experienced decompression sickness symptoms. However, no lung function problems could be identified, suggesting that stressful dives may cause 'silent' pulmonary bubble emboli to form, but no effects are experienced relative to lung mechanical behavior. M.S.K.

A87-11660* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EFFECT OF ANTIGRAVITY SUIT INFLATION ON CARDIOVASCULAR, PRA, AND PVP RESPONSES IN HUMANS
S. E. KRAVIK, L. C. KEIL, G. GEELEN, C. E. WADE, P. R. BARNES (NASA, Ames Research Center, Moffett Field; U.S. Army, Letterman Army Medical Center, San Francisco, CA) et al. Journal of Applied Physiology (ISSN 0161-7567), vol. 61, Aug. 1986, p. 766-774. refs

The effects of lower body and abdominal pressure, produced by antigravity suit inflation, on blood pressure, pulse rate, fluid and electrolyte shift, plasma vasopressin and plasma renin activity in humans in upright postures were studied. Five men and two women stood upright for 3 hr with the suit being either inflated or uninflated. In the control tests, the suit was inflated only during the latter part of the trials. Monitoring was carried out with a sphygnomanometer, with sensors for pulse rates, and using a photometer and osmometer to measure blood serum characteristics. The tests confirmed earlier findings that the anti-g suit eliminates increases in plasma renin activity. Also, the headward redistribution of blood obtained in the tests commends the anti-g suit as an alternative to water immersion or bed rest for initial weightlessness studies. M.S.K.

A87-12850
SENSITIVITY OF THE HUMAN SKIN TO INFRARED THERMAL RADIATION FLUXES [O CHUVSTVITEL'NOSTI KOZHI CHELOVEKA K INFRAKRASNYM TEPLOVYM POTOKAM]
R. F. MUSIN, N. IU. IVANOVA, V. A. MARTYNOV, V. A. MOROZOV, E. E. GODIK (AN SSSR, Institut Radiotekhniki i Elektroniki, Moscow, USSR) et al. Akademiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 289, no. 3, 1986, p. 718-720. In Russian.

Experiments involved the measurement of current patterns through the horny layer of the epidermis under the effect of weak IR thermal radiation fluxes of different intensities: 10, 5, 3, 1.5, and 0.5 mW/sq cm. This made it possible to determine the threshold sensitivity of human skin to IR heat fluxes. Human skin is shown to be highly sensitive to such fluxes. B.J.

A87-12922
FEATURES OF THE REGULATION OF THE CARDIORESPIRATORY SYSTEM IN HUMANS DURING ADAPTATION TO A HOT CLIMATE [OSOBENNOSTI REGULIATSII KARDIORESPIRATORNOI SISTEMY PRI ADAPTATSII CHELOVEKA K ZHARKOMU KLIMATU]
N. A. AGADZHANIAN, A. I. ELFIMOV, A. E. SEVERIN, IU. P. STARSHINOV, and V. V. BUTYLKIN IN: Adaptation of humans and animals to extreme environmental conditions . Moscow, Izdatel'stvo Universiteta Druzhby Narodov, 1985, p. 82-98. In Russian. refs

The effect of physical exercise on the parameters of the functional respiratory state and gas-exchange was studied in natives of a hot arid zone of Central Asia and in nonnatives residing permanently in the same area. It was found that the process of cardiovascular adaptation to the conditions of hot dry climate is accompanied by morphological changes (e.g., the increases in the body surfaces and the lung surfaces). In the native subjects, the application of a physical load tended to elevate the heart functional indices, while in the adapted nonnatives, the performance of an exercise was followed by high increases in the respiratory functions. The reaction of external respiration to hypercapnia was more strongly expressed in the adapted nonnatives than in the natives. It is concluded that the adaptation in the nonnatives takes place predominantly through the regulatory changes, whereas in the natives the adaptational changes are constitutional. I.S.

A87-12923
THE THERMOREGULATORY CHARACTERISTICS OF INHABITANTS OF DIFFERENT CLIMATIC-GEOGRAPHICAL REGIONS DURING ADAPTATION TO MODERATE CLIMATE [OSOBENNOSTI TERMOREGULIATSII ZHITELEI RAZNYKH KLIMATOGEOGRAFICHESKIKH REGIONOV PRI ADAPTATSII K UMERENNOMU KLIMATU]
I. I. LIZUNOVA IN: Adaptation of humans and animals to extreme environmental conditions . Moscow, Izdatel'stvo Universiteta Druzhby Narodov, 1985, p. 98-116. In Russian. refs

A87-12924
FUNCTIONS OF THE HUMAN ORGANISM DURING PROLONGED STAY AND WORK IN EXTREME CONDITIONS OF CAVES [FUNKTSII ORGANIZMA CHELOVEKA PRI DLITEL'NOM PREBYVANII I RABOTE V EKSTREMAL'NYKH USLOVIIAKH PESHCHER]
V. V. ESHCHENKO IN: Adaptation of humans and animals to extreme environmental conditions . Moscow, Izdatel'stvo Universiteta Druzhby Narodov, 1985, p. 117-138. refs

The effects on humans of prolonged stay in the adverse environment of a deep cave, i.e., prolonged isolation from the customary spatial-temporal reference points, low temperatures, high humidity, sensory deprivation, and prolonged physical work, were studied. The subjects worked continuously for 10 to 86 days at depths of 760 to 1345 m. Cardiorespiratory indices, the water-electrolyte balance indices, and various hematological and biochemical parameters were measured periodically. Three periods of adaptation were distinguished: (1) acute adaptation in the first 11 days; (2) stabilization, continuing up to the 21st-23rd day, and (3) the 'relative adaptation' period. Adaptive changes in the cardiovascular and respiratory systems, water-electrolyte balance, and circadian rhythms were noted. It was found that application of physical loads facilitated adaptation, although prolonged continuous work for up to 50 days tended to lower work capacity. I.S.

N87-10674* National Aeronautics and Space Administration, Washington, D.C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES
Oct. 1986 76 p
(NASA-SP-7011(289); NAS 1.21:7011(289)) Avail: Issuing Activity CSCL 06E

This bibliography lists 210 reports, articles and other documents introduced into the NASA scientific and information system in September 1986. Author

N87-10675# European Space Agency, Paris (France).
PROCEEDINGS OF 2ND INTERNATIONAL CONFERENCE ON SPACE PHYSIOLOGY
J. J. HUNT, ed. Feb. 1986 259 p Partly in ENGLISH and FRENCH Conference held in Toulouse, France, 20-22 Nov. 1985; sponsored by ESA and CNES
(ESA-SP-237; ISSN-0379-6566; ETN-86-97561) Avail: NTIS HC A12/MF A01

The effects of space flight on the cardiovascular system, fluid and electrolyte regulations, bones and muscles, neurovestibular system, and motion sickness were discussed. Ground based weightlessness simulation, animal models, and mathematical models were reviewed. ESA

N87-10676# Copenhagen Univ. (Denmark). August Krogh Inst.
CARDIOVASCULAR MEASUREMENTS IN MICROGRAVITY
P. NORSK and F. BONDE-PETERSEN *In* ESA Proceedings of 2nd International Conference on Space Physiology p 9-12 Feb. 1986
Avail: NTIS HC A12/MF A01

Skylab and Biosatellite 3 cardiovascular measurements are discussed. During microgravity the volume of the lower extremities decreases while the intrathoracic blood volume increases. This is indicated by the decrease in calf girth measured during the Skylab missions and the increase in central venous pressure measured in a monkey on Biosatellite 3 and in human subjects during short periods of microgravity in a parabolic flight. An increase in left ventricle diastolic volume, cardiac output, and stroke volume supports this. Probably due to this translocation of extracellular fluid, cardiovascular reflexes are elicited inducing increased peripheral blood flow and decreased venous compliance with a decrease in orthostatic tolerance. Changes in electrocardiographic measurements indicate a prolonged PR-interval and an increase in QRS maximum vector magnitude. ESA

N87-10677# Centre Hospitalier Univ. Rangueil, Toulouse (France). Service Neurologie.
CARDIOVASCULAR EXAMINATION DURING STS 51 G MISSION JUNE (1985)
L. POURCELOT (Hopital Bretonneau, Tours, France), P. ARBEILLE, J. M. POTTIER, L. PATAT, M. BERSON, A. RONCIN, C. LETOULLEC, A. GUELL, and C. GHARIB (Lyon-1 Univ., France) *In* ESA Proceedings of 2nd International Conference on Space Physiology p 13-17 Feb. 1986
Avail: NTIS HC A12/MF A01

Cardiovascular examination was performed on two astronauts during STS 51 G. The ultrasound based device used for the study was designed for multimode operation: real time imaging, time-motion, Doppler, and duplex B-Doppler. Cardiac function and volume changes, blood flow volume in carotid and femoral arteries, transit time of pressure waves, and venous circulation were studied preflight, inflight and postflight. The dynamic response of the cardiovascular system was measured inflight and during ground simulation. Results show a decrease of cardiac output stroke volume and left ventricular diastolic volume; a decrease in cerebral

circulatory resistance, and variations in peripheral resistance and vascular stiffness of the lower limbs in accordance with orthostatic disturbances during the recovery period. ESA

N87-10678# Centre d'Essais en Vol, Bretigny-sur-Orge (France). Lab. de Medecine Aerospatiale.
THE INTEREST OF CENTRIFUGE TESTS FOR THE SELECTION OF FRENCH COSMONAUTS [INTERET DES EPREUVES EN CENTRIFUGEUSE POUR LA SELECTION DES COSMONAUTES FRANCAIS]
J. M. CLERE, B. AGIN, Y. GUEZENNEC, J. L. POIRIER, and H. VIEILLEFOND *In* ESA Proceedings of 2nd International Conference on Space Physiology p 21-27 Feb. 1986 In FRENCH
Avail: NTIS HC A12/MF A01

Human centrifuge tests for space flight crew selection are reviewed. The tests examine cardiovascular response to gravitational stresses equivalent to those encountered during launch and reentry. They include electrocardiograms, heart rate, blood pressure, central and peripheral vision, and arterial oxygen saturation. Results led to the elimination of 2 payload specialists (from 13 candidates) even though they have no functions to execute under hypergravity. ESA

N87-10679# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE REGULATION OF FLUID AND ELECTROLYTE METABOLISM IN WEIGHTLESSNESS
C. S. LEACH, P. C. JOHNSON, and N. M. CINTRON *In* ESA Proceedings of 2nd International Conference on Space Physiology p 31-36 Feb. 1986
Avail: NTIS HC A12/MF A01

Endocrine and biochemical changes in astronauts caused by weightlessness are discussed. Translocation of fluid from the extremities to the head and chest at the onset of weightlessness is thought to lead to the establishment of a lower blood volume as an adaptation to microgravity. Results of Skylab experiments indicate that several other regulatory systems have lower homeostatic set points during space flight. Inflight blood samples from three Spacelab flights show increased antidiuretic hormone throughout these short flights and decreased aldosterone and cortisol after 3 days. Results help to explain blood hypoosmolality and hyponatremia but do not explain what happens between the onset of weightlessness and hormone changes. Other factors such as natriuretic peptides and changes in renal function are being studied to elucidate the physiologic adaptation mechanisms. ESA

N87-10680# Hopital Lariboisiere, Paris (France).
ANTICORTISOL MONOCLONAL ANTIBODIES: CHARACTERIZATION OF THEIR SPECIFICITY [ANTICORPS MONOCLONAUX ANTI-CORTISOL: CARACTERISATION DE LEUR SPECIFICITE]
P. J. BIRKUI, P. POULETTY (CLONATEC, Paris, France), C. REBOLLO, and M. LEROY (Hopital Saint Louis, Paris, France) *In* ESA Proceedings of 2nd International Conference on Space Physiology p 37-39 Feb. 1986 In FRENCH
Avail: NTIS HC A12/MF A01

Four anticortisol monoclonal antibodies from a group of nine developed by cell fusion were studied. Their constant of affinity was investigated by radioimmunological dosing in competition. Cross reactivity was evaluated on a panel of 10 structural analogs of cortisol by the same technique. The molar concentrations used for each analog corresponded to 5000 times (or more) the concentration of plasma in human physiology. The antibodies can be used to specify the structure/antigen relation of steroids and to fix a dose of cortisol by competition. ESA

N87-10681# Hopital Nord, Saint-Priest-en-Jarez (France). Lab. de Biologie du Tissu Osseux.
BONES AND WEIGHTLESSNESS [OS ET APESANTEUR]
C. ALEXANDRE *In* ESA Proceedings of 2nd International Conference on Space Physiology p 45-52 Feb. 1986 In FRENCH
Avail: NTIS HC A12/MF A01

The effects of weightlessness on the phosphorus and calcium metabolisms and on bone remodeling are reviewed. The difficulties of extrapolating data from ground based studies to space conditions are discussed, and contradictions in results from space flights are noted. Weightlessness appears to affect load bearing and non load bearing bones differently. During the first two weeks in space, bone demineralization occurs, but the process stabilizes afterwards. The old bone ages through reduced turnover, while the new bone is immature and is quickly eliminated. These phenomena are completely reversible after a few weeks, but only partially reversible after two or three months. ESA

N87-10682# European Space Agency, Paris (France).
THE MUSCULAR SYSTEM IN WEIGHTLESSNESS [LE SYSTEME MUSCULAIRE EN APESANTEUR]
Y. MOUNIER *In* ESA Proceedings of 2nd International Conference on Space Physiology p 53-59 Feb. 1986 In FRENCH
Avail: NTIS HC A12/MF A01

Muscular atrophy, especially in the legs, after a period of weightlessness is discussed. The drop in muscular strength may be due to a decrease in the calcium affinity of the contractile proteins. The muscles acquire kinetic functions opposite those characteristic of the functions normally found on the ground. The proportions of slow and fast fibers of each muscle are modified. These phenomena can be interpretated via a purely muscular theory of molecular rearrangement and/or by considering changes in nerve control of muscle commands after a stay in space. ESA

N87-10683# Universite des Sciences et Techniques de Lille (France).
MICROGRAVITY EFFECTS ON THE CONTRACTILE PROTEINS OF RAT MUSCLES
X. HOLY, Y. MOUNIER, and C. GOBLET *In* ESA Proceedings of 2nd International Conference on Space Physiology p 61-64 Feb. 1986
Avail: NTIS HC A12/MF A01

Tensions activated by calcium concentrations on chemically skinned fibers of rat muscles were used to study the effect of microgravity on contractile protein activity. Three muscles (gastrocnemius, plantaris, and diaphragm) and three groups (vivarium, synchronous, and flight rats) were tested. The muscle function criteria studied were the maximum mechanical activity, the cross-bridge cycling speed, and calcium binding affinity. Microgravity induces a decrease of maximum mechanical activity on gastrocnemius and plantaris; no modification is observed on diaphragm. Cross-bridge cycling speed and calcium binding affinity are reduced on gastrocnemius; plantaris muscle only exhibits a reduction in cross-bridge activity. ESA

N87-10684# Hopital Nord, Saint-Priest-en-Jarez (France). Lab. de Biologie du Tissu Osseux.
WEIGHTLESSNESS EFFECTS ON THE BONE TISSUE OF RATS AFTER A 5 DAY SPACE FLIGHT (COSMOS 1514) [EFFETS DE L'APESANTEUR SUR LE TISSU OSSEUX DE RAT APRES UN VOL SPATIAL DE CINQ JOURS (COSMOS 1514)]
L. VICO, D. CHAPPARD, C. ALEXANDRE, S. PALLE, P. MINAIRE, G. RIFFAT, A. I. GRIGORIEV, and V. S. OGANOV *In* ESA Proceedings of 2nd International Conference on Space Physiology p 67-78 Feb. 1986 In FRENCH
Avail: NTIS HC A12/MF A01

Five pregnant female rats (rapid growth phase) were exposed to weightlessness in a Cosmos satellite. Two other groups of five (vivarium, synchronous) were also studied. Histomorphometric analyses were performed to study: early effects on bone mass of load bearing (tibia-femur) and non load bearing bones (dorsal and

lumbar vertebrae); and osteoblast and osteoclast activity. Short stays in weightlessness appear to have no effect on bone mass and bone structure. Vertebrate osteoblasts are also unaffected. Osteoclasts/cumm do not vary, but an increase per sqmm on the bone surface is noted. Bone formation of non bearers is unaffected after 5 days, but absorption increases. ESA

N87-10685# Hopital Nord, Saint-Priest-en-Jarez (France). Lab. de Biologie du Tissu Osseux.

BONE TISSUE AND MUSCULAR PERFORMANCE IN A POPULATION OF ELDERLY MEN AS A FUNCTION OF PHYSICAL EXERCISE [TISSU OSSEUX ET PERFORMANCES MUSCULAIRES DANS UNE POPULATION D'HOMMES SAINS AGES, EN FONCTION DE LEUR NIVEAU D'EXERCICE PHYSIQUE]

L. VICO, D. CHAPPARD, C. ALEXANDRE, S. PALLE, J. C. CHATARD, J. R. LACOUR, and G. RIFFAT *In* ESA Proceedings of 2nd International Conference on Space Physiology p 79-88 Feb. 1986 In FRENCH

Avail: NTIS HC A12/MF A01

Muscular performance of 20 male volunteers aged between 61 and 77 (3 sedentary; 6 doing less than 3 hr sport/week; 5 doing 3 to 6 hr; 6 doing less than 6 hr) was studied. Results show that less than 6 hr sport/week maintains bone mass and stimulates bone cell activity. Over 6 hr, stimulated bone remodeling leads to thinning of the corticals. ESA

N87-10688# Institute of Biomedical Problems, Moscow (USSR).

BONE EXAMINATION BY NONINVASIVE TECHNIQUES IN A 120-DAY HEAD-DOWN TILT TEST

A. I. GRIGORIEV, V. S. OGANOV, A. S. RAKHMANOV, B. V. MORUKOV, H. A. JANSON (Polytechnic Inst., Riga, USSR), V. V. DZENIS, and V. E. ZAICHICK (Institute of Medical Radiology, Moscow, USSR) *In* ESA Proceedings of 2nd International Conference on Space Physiology p 99-103 Feb. 1986

Avail: NTIS HC A12/MF A01

The effect of 120-day head-down tilt (-5 deg) on bones was investigated using gamma-photon absorptiometry, ultrasonic introscopy, and neutro-activation analyses. The study was carried out on 15 test subjects divided into a control group and 3 groups that used various countermeasures (drugs, exercises, or a combination of drugs and exercises). No strict correlation is established between the negative calcium balance and the variation of photon absorptiometry and neutron-activation data. The mineral content of leg bones is best in the drug groups. The noninvasive methods of mineral measurement and mechanical properties of bones are compared from the point of view of their diagnostic and prognostic significance. ESA

N87-10689# Hopital Nord, Saint-Priest-en-Jarez (France). Lab. de Biologie du Tissu Osseux.

HISTOMORPHOMETRIC STUDY OF BONE CELL MASS AND ACTIVITY IN MAN CAUSED BY A 120 DAY DECUBITUS. TEST OF PREVENTIVE PROTOCOLS [ETUDE HISTOMORPHOMETRIQUE DES MODIFICATIONS DE LA MASSE ET DES ACTIVITES CELLULAIRES OSSEUSES INDUITE PAR UN DECUBITUS DE 120 JOURS CHEZ L'HOMME. ESSAI DE PROTOCOLES PREVENTIFS]

L. VICO, D. CHAPPARD, C. ALEXANDRE, S. PALLE, P. MINAIRE, and G. RIFFAT *In* ESA Proceedings of 2nd International Conference on Space Physiology p 105-114 Feb. 1986 In FRENCH

Avail: NTIS HC A12/MF A01

The effects of 120 days immobilization on bones was studied using 20 healthy male volunteers divided into: (1) 5 ambulant subjects (control); (2) 3 strictly immobilized; (3) 4 hypokinetic receiving a diphosphonate; (4) 4 hypokinetic taking exercise; and (5) 4 hypokinetic taking exercise plus diphosphonate. Results show that for (3) bone formation and absorption diminish; for (4) they increase; for (5) they diminish, but less than for (3). No bone loss is noted for (2). Results show the difficulties of extrapolating findings of weightlessness simulation to space conditions, although exercise seems to have the greatest effect in both cases. ESA

N87-10690# Hopital Nord, Saint-Priest-en-Jarez (France). Lab. de Biologie du Tissu Osseux.

AMPUTATION-INDUCED OSTEOPOROSIS: A NEW MODEL TO EXPLORE THE EFFECTS OF WEIGHTLESSNESS ON THE HUMAN SKELETON

D. CHAPPARD, C. ALEXANDRE, L. VICO, S. PALLE, and G. RIFFAT *In* ESA Proceedings of 2nd International Conference on Space Physiology p 115-118 Feb. 1986

Avail: NTIS HC A12/MF A01

Leg amputees were used to explore the absence of load bearing and muscle activity on the homolateral pelvis. Amputation induces a localized form of osteoporosis of the hemipelvis on the affected side. A histomorphometric analysis indicates that cortical and trabecular bones rarefy with a marked thinning of the trabeculae, while the trabecular number is less affected. Amputation realizes a unique form of microgravity with muscular ineffectiveness and provides a better human model than bed-rest immobilization of spinal injured patients since neurovascular changes are not present. ESA

N87-10691# Hopital Nord, Saint-Priest-en-Jarez (France). Lab. de Biologie du Tissu Osseux.

WEIGHTLESSNESS EFFECTS ON THE PHOSPHORUS-CALCIUM BALANCE AND ITS HORMONAL REGULATION IN MAN DURING STS FLIGHT 51-G [EFFETS DE L'APESANTEUR SUR LE BILAN PHOSPHO-CALCIQUE ET SA REGULATION HORMONALE CHEZ L'HOMME AU COURS DU VOL SPATIAL 51 G]

C. ALEXANDRE, G. PILONCHERY, C. CHAPUY, and P. DELMAS *In* ESA Proceedings of 2nd International Conference on Space Physiology p 119-124 Feb. 1986 In FRENCH

Avail: NTIS HC A12/MF A01

Blood and urine minerals were measured in STS 51-G astronauts (1 man, 1 woman) 30, 7, and 4 days preflight, on return, and 2 and 4 days postflight. Results confirm bone demineralization and bone matrix atrophy at the start of the flight. They are well correlated with osteoclast increases observed in rats during a 5 day flight. However, bone formation problems in rats after 20 days in space can be retarded in man. The variations do not depend on the hormone control system, and are an adaptation of the bone to weightlessness. ESA

N87-10692# Centre National de la Recherche Scientifique, Paris (France). Lab. de Physiologie Neurosensorielle.

PRELIMINARY RESULTS ON THE EQUILIBRIUM AND VERTIGO EXPERIMENT PERFORMED DURING STS 51-G SHUTTLE FLIGHT

G. CLEMENT, T. VIEVILLE, F. LESTIENNE, and A. BERTHOZ *In* ESA Proceedings of 2nd International Conference on Space Physiology p 129135 Feb. 1986

Avail: NTIS HC A12/MF A01

The Equilibrium and Vertigo experiment on STS 51-G studied the motor strategies underlying the adaptation of sensorimotor systems to microgravity. Using data from Salyut-7 and Spacelab-1, interaction between posture and movement, role of vision in postural control, modifications of the optokinetic nystagmus, and the vestibulo-ocular reflex were investigated. Results suggest a general downward drive exerted by the otoliths on the first exposure to microgravity, and an upward drive on the first days of return. In microgravity the antigravity tonic influence exerted by the sacculus (which tends on Earth to lift upward the body, the limbs, and the eyeball) is suppressed in order to compensate for the downward pull of gravity. Downward eye movements and activity of flexor muscles are enhanced. On return, gravity is perceived as an upward linear acceleration, inducing an upward drive opposite to the downward inertial force vector. Consequently, upward eye movements and activity of extensor muscles are facilitated. ESA

N87-10693# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SPACE MOTION SICKNESS
J. M. VANDERPLOEG, D. F. STEWART, and J. R. DAVIS *In* ESA Proceedings of 2nd International Conference on Space Physiology p 137-142 Feb. 1986
Avail: NTIS HC A12/MF A01

Space motion sickness clinical characteristics, time course, prediction of susceptibility, and effectiveness of countermeasures were evaluated. Although there is wide individual variability, there appear to be typical patterns of symptom development. The duration of symptoms ranges from several hours to four days with the majority of individuals being symptom free by the end of third day. The etiology of this malady remains uncertain but evidence points to reinterpretation of otolith inputs as being a key factor in the response of the neurovestibular system. Prediction of susceptibility and severity remains unsatisfactory. Countermeasures tried include medications, preflight adaptation, and autogenic feedback training. No countermeasure is entirely successful in eliminating or alleviating symptoms. ESA

N87-10694# Centre d'Essais en Vol, Bretigny-sur-Orge (France). Lab. de Medecine Aerospatiale.
VESTIBULAR TESTS IN COSMONAUT SELECTION AND TRAINING [LES TESTS VESTIBULAIRES DANS LA SELECTION ET L'ENTRAINEMENT DES COSMONAUTES]
A. LEGER, D. LEJEUNE, F. MIDY, and M. KERGUELEN *In* ESA Proceedings of 2nd International Conference on Space Physiology p 143-148 Feb. 1986 In FRENCH
Avail: NTIS HC A12/MF A01

Experiment designs used in cosmonaut selection vestibular tests are described. The tests include a questionnaire used for preselection and Coriolis acceleration tests at 90 and 180 deg/sec for 4 min. Differences between American and Soviet training methods are discussed. ESA

N87-10695# Centre National d'Etudes Spatiales, Toulouse (France).
INFRARED MEASUREMENT OF EYE MOVEMENT. PRESENTATION OF THE EYE MOVEMENT IN INFRARED AND ANGULAR TORSION (EMIRAT) EXPERIMENT [MESURE DU MOUVEMENT DE L'OEIL EN INFRAROUGE. PRESENTATION DE L'EXPERIENCE EMIRAT ET DES TRAITEMENTS TEMPS DIFFERE]
A. L. CAMUS *In* ESA Proceedings of 2nd International Conference on Space Physiology p 149-152 Feb. 1986 In FRENCH
Avail: NTIS HC A12/MF A01

A system to measure eye movements of subjects in weightlessness was flown on Spacelab D1 mission. A helmet mounted infrared camera films the eye at 60 frames/sec. The image signal is transmitted to the ground in digital form. Ground equipment calculates the horizontal and vertical position of the center of the pupil and torsion angle in real time. Complete data processing off-line reconstructs eye movement around the X, Y, and Z axes, and derives the stimulus-eye response correlation. ESA

N87-10696# Groupe d'Etude en Medecine et Physiologie Spatiales, Toulouse (France).
GROUND BASED SIMULATION TECHNIQUES FOR CARDIOVASCULAR AND HORMONAL CHANGES OBSERVED IN MAN IN WEIGHTLESSNESS [LES TECHNIQUES DE SIMULATION AU SOL DES MODIFICATIONS CARDIO-VASCULAIRES ET HORMONALES OBSERVEES CHEZ L'HOMME EN IMPESANTEUR]
A. GUELL, C. GHARIB, J. L. MAUROUX, J. M. POTTIER, P. ARBEILLE, L. POURCELOT, and A. BES *In* ESA Proceedings of 2nd International Conference on Space Physiology p 157-162 Feb. 1986
Avail: NTIS HC A12/MF A01

Immersion and bed rest techniques used to simulate weightlessness effects on body fluid flow, and thus cardiovascular and hormonal responses, are reviewed. Applications to spaceborne experiment design and to studies of microgravity adaptation are discussed. ESA

N87-10697# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
THE USE OF DECOMPRESSION TO SIMULATE THE EFFECT OF EXTRAVEHICULAR ACTIVITY ON HUMAN LYMPHOCYTE TRANSFORMATION
R. T. MEEHAN (Texas A&M Univ., Galveston), U. DUNCAN, L. NEALE, J. WALIGORA, and G. R. TAYLOR *In* ESA Proceedings of 2nd International Conference on Space Physiology p 163-166 Feb. 1986
Avail: NTIS HC A12/MF A01

Lymphocytes from 35 subjects participating in a chamber study simulating extravehicular activity (EVA) conditions were studied. No significant differences in H3 thymidine uptake between pre chamber and post chamber response to any mitogens autologous plasma, or among circulating mononuclear cells by flow cytometry are observed. The studies could not identify the subjects who developed venous bubbles. Data from eight subjects suggests that acute stress associated with participating in the study augments in vitro lymphocyte proliferation. Results indicate EVA exposure does not greatly influence space-flight induced alterations in immune effector cell function. ESA

N87-10698# Institute of Biomedical Problems, Moscow (USSR).
METABOLIC CHANGES DURING PROLONGED ANTIORTHOSTATIC HYPOKINESIA
I. A. POPOVA, B. V. MORUKOV, and A. S. USHAKOV *In* ESA Proceedings of 2nd International Conference on Space Physiology p 167-172 Feb. 1986
Avail: NTIS HC A12/MF A01

Variations of biochemical parameters of blood and urine of the normal man during a 120-day head-down tilt test were studied. A test of 9 healthy male volunteers, aged 25 to 44, led to a negative balance of water and electrolytes with calcium losses of 5 g per month. Changes in the ionic composition of blood include a decrease of potassium and an increase of total calcium and its ionized fraction. Weight losses average 1.8 kg, primarily due to muscle losses responsible for changes in protein homeostasis. The content of free amino acids increases, total protein decreases (mainly due to the decrease of albumins), the content of nitrogen products of protein metabolism increases although their renal excretion remains unchanged. The prolonged antiorthostatic exposure changes the level of tissue metabolism as indicated by a change in the activity of blood enzymes. The isoenzymic specificity suggests that metabolic changes occur primarily in bones and muscles. ESA

N87-10699# Lyon-1 Univ. (France). Faculte de Medecine Grange Blanche.
LEVELS OF PLASMA ATRIAL NATRIURETIC FACTOR (ALPHA H ANF) DURING ACUTE SIMULATED WEIGHTLESSNESS
C. GHARIB, G. GAUQUELIN, G. GEELIN, M. VINCENT, F. GHAEMMAGHAMI, C. GRANGE, M. CANTIN (Institut Recherches Cliniques, Montreal, Quebec), J. GUTKOVSKA, and A. GUELL (Centre Hospitalier Univ. Rangueil, Toulouse, France) *In* ESA Proceedings of 2nd International Conference on Space Physiology p 173-176 Feb. 1986 Sponsored by CNES
(Contract DRET-50-85-26)
Avail: NTIS HC A12/MF A01

Head-down tilt at -9 deg (n = 3) and head-out water immersion (n = 2) were used to study the variations of the atrial natriuretic factor (alphahANF). Data show a rapid elevation of alphahANF during the first 60 min of head-down tilt, accompanied by a decrease in plasma renin activity (PRA) plasma osmolality and protein concentration. The same results along with a decrease in PRA and vasopressin are obtained for immersion, but the curve of alphahANF is blunted and the level of alphahANF remains increased during the 2 hr of the experiment. The known actions of ANF on GFR, FF, renin and aldosterone could explain data obtained during simulated weightlessness. ESA

N87-10700# Lyon-1 Univ. (France). Faculte de Medecine Grande Blanche.

VOLUME REGULATING HORMONES DURING A 5 HOUR HEAD-DOWN TILT AT -10 DEG. PART 1: EPINEPHRINE, NOREPINEPHRINE AND DOPAMINE

A. GUELL (Centre Hospitalier Univ. Rangueil, Toulouse, France), J. M. PEQUIGNOT, G. GAUQUELIN, J. L. BASCANDS, G. GEELEN, A. M. ALLEVARD, G. ANNAT, L. POURCELOT (Hopital Bretonneau, Tours, France), L. PEYRIN, A. BES (Centre Hospitalier Univ. Rangueil, Toulouse, France) et al. *In* ESA Proceedings of 2nd International Conference on Space Physiology p 177-179 Feb. 1986 Sponsored by CNES and DIGITAL France

(Contract DRET-50-85-26)

Avail: NTIS HC A12/MF A01

In order to determine the short term effects of weightlessness simulation on plasma catecholamines (epinephrine) (E), norepinephrine (NE) and dopamine (DA) and to compare the results with the supine position taken as control for simulation studies, 10 young healthy volunteers were submitted to 3 postural tests. Tests were: day 1: 7 hr sitting; day 2: 1 hr sitting, then 5 hr horizontal supine and 1 hr sitting; day 3: 1 hr sitting, then 5 hr head-down tilt -10 deg, and 1 hr sitting. The results show that a 5 hr head-down tilt or bed rest induce an early decrease in NE compared to the seated position; E decreases in head-down tilt only. During such maneuvers there is decrease in the sympathoadrenal activity which could explain the decrease in plasma renin activity. ESA

N87-10701# Institute of Biomedical Problems, Moscow (USSR).

RELATIONSHIP BETWEEN CARDIOVASCULAR FUNCTIONS AND FLUID-ELECTROLYTE METABOLISM DURING ANTIORTHOSTATIC HYPOKINESIA

A. A. SAVILOV, V. M. MIKKAILOV, and A. I. GRIGORIEV *In* ESA Proceedings of 2nd International Conference on Space Physiology p 181-186 Feb. 1986

Avail: NTIS HC A12/MF A01

The cardiovascular function and fluid-electrolyte metabolism in healthy men exposed to head-down tilt tests of 7 days to 6 months were investigated. During the first hours and days of exposure the cardiovascular changes are associated with hemodynamic shifts typical of this simulation procedure, while fluid-electrolyte changes are manifestations of the compensatory-adaptive reactions aimed at maintaining an adequate circulatory homoestasis. As the exposure continued for several months, the cardiovascular changes, particularly cardiovascular deconditioning, are produced by the effect of hypokinesia as such. In this situation changes in fluid-electrolyte balance are one of the major factors responsible for cardiovascular disorders. Water-salt supplements combined with other countermeasures may help to decrease significantly the adverse effects of antiorthostatic hypokinesia and weightlessness on the human body. ESA

N87-10702# Erlangen-Nuremberg Univ. (West Germany). Med. Poliklinik.

EXERCISE-INDUCED MYOCARDIAL ISCHEMIA AT HIGH ALTITUDE SIMULATED IN A NEGATIVE PRESSURE CHAMBER

H. J. DEUBER, A. WORTMAN, and K. BACHMANN *In* ESA Proceedings of 2nd International Conference on Space Physiology p 187-190 Feb. 1986

Avail: NTIS HC A12/MF A01

The influence of high altitude hypoxia on myocardial ischemia in 15 patients aged 48 to 73 with coronary heart disease was studied during rest and during bicycle ergometry at simulated altitudes of 1000 and 9000ft above sea level. At high altitude the working capacity is significantly reduced due to an earlier onset of angina pectoris and ST-segment depressions. Without labor there is no angina pectoris or ST-segment depression. ESA

N87-10703# Lyon-1 Univ. (France). Faculte de Medecine Grande Blanche.

VOLUME REGULATING HORMONES DURING A 5-HOUR HEAD-DOWN TILT AT -10 DEG. PART 2: PLASMA RENIN ACTIVITY AND ALDOSTERONE

G. GAUQUELIN, A. GUELL (Centre Hospitalier Univ. Rangueil, Toulouse, France), J. L. MAUROUX, G. GEELEN, G. ANNAT, M. VINCENT, A. M. ALLEVARD, A. SASSOLAS, C. A. BIZOLLON, and C. GHARIB *In* ESA Proceedings of 2nd International Conference on Space Physiology p 191-193 Feb. 1986 Sponsored by CNES and DIGITAL France

(Contract DRET-50-85-26)

Avail: NTIS HC A12/MF A01

Head-down tilt experiments were conducted to simulate the cardiovascular and hormonal modifications occurring during space flight. The short term effects of weightlessness simulations on the hormones controlling volume homoestasis were observed. Ten young healthy volunteers were submitted to 3 postural tests: day 1: 7 hr sitting; day 2: 1 hr sitting, then 5 hr horizontal supine and 1 hr sitting; day 3: 1 hr sitting, then 5 hr head down tilt, and 1 hr sitting. The results show that a 5 hour horizontal bed rest or head-down tilt induce an early and progressive decline of PRA and aldosterone which is comparable to that observed during immersion. The study also shows that posture during the control period is critical. ESA

N87-10709# National Aeronautics and Space Administration, Washington, D.C.

MATH MODELLING AS A COMPLEMENT TO THE SCIENTIFIC INQUIRY OF PHYSIOLOGICAL ADAPTATION TO SPACE FLIGHT: FLUID, ENDOCRINE AND CIRCULATORY REGULATION

J. I. LEONARD (General Electric Co., Washington, D. C.), R. J. WHITE, and J. A. RUMMEL (MAP, Inc., Houston, Tex.) *In* ESA Proceedings of 2nd International Conference on Space Physiology p 233-244 Feb. 1986

(Contract NAS9-15487; NAS9-16328; NAS9-15850; NAS9-17151)

Avail: NTIS HC A12/MF A01 CSCL 06P

The contribution of mathematical modeling and computer simulation to the understanding of problems arising during weightless space flight is reviewed. Examples from fluid, endocrine, and circulatory regulation are provided to illustrate the utility of modeling as an adjunct to the process of scientific inquiry, especially in the development and theoretical testing of hypotheses. The models were used to examine the acute and chronic phases of space flight. Paradoxial results appear when data obtained during chronic adaptation is interpreted using theories which pertain to acute adjustments. The modeling process provides a means of developing a theoretical basis for interpreting the chronic adaptive phase of flight. ESA

N87-10710# Army Research Inst. of Environmental Medicine, Natick, Mass.

UPPER AND LOWER BODY ANAEROBIC POWER COMPARISON BETWEEN BIATHLETES AND CONTROL SUBJECTS

J. F. PATTON and A. DUGGAN Apr. 1986 21 p

(AD-A167636; USARIEM-M25/86) Avail: NTIS HC A02/MF A01 CSCL 06P

This study compared power outputs (PO) from both the upper body (UB) and lower body (LB) Wingate tests of anaerobic power between biathletes and control subjects. Ten biathletes (B) selected by the British Ski Federation for potential assignment to the British team and 13 control (C) subjects cranked or pedalled the same Bodyguard ergometer at maximal RPM's for 30s against resistances of 2.94 and 4.41 joules/rev/kg body weight (BW), respectively. PO's were calculated in watts (W) and expressed as peak power (PP, highest 5s interval), mean power (MP, the mean for 30s), and power decrease (PD, difference between PP and lowest 5s PO divided by time). Absolute PP and MP for both UB and LB did not differ between groups. A comparison of PO's made relative to BW showed B to have higher values than C: 11.25 vs 10.25 W/kg for LB PP ($p<.01$) and 9.21 vs 7.96 W/kg for LB MP

($p<.001$). Similar PO relationships were found for the UB where PP and MP values were higher for B than C: 7.61 vs 6.76 W/kg ($p<.01$) and 6.07 vs 4.95 W/kg ($p<.001$), respectively. Concomitantly, PD was lower in B than C for both the UB ($p<.01$) and Lb ($p<.001$). These data show that significant differences exist in the anaerobic performance of aerobically trained athletes compared to subjects who are not highly trained and that these differences are reflected in the musculature of the Ub as well as the legs. GRA

N87-10711# School of Aerospace Medicine, Brooks AFB, Tex.
RADIATION DOSES FROM FLYING THROUGH NUCLEAR DEBRIS CLOUDS Final Report, 2-10 Jan. 1985
P. M. VANDENBOSCH and A. WOODRUM Apr. 1986 20 p
(AD-A167959; USAFSAM-TR-85-86) Avail: NTIS HC A02/MF A01 CSCL 15F

Taboada et al. have recently developed a computer model to predict gamma radiation doses to aircrews flying through nuclear debris clouds. Although the model has the advantages of taking a large number of parameters into account and using the benchmark DELFIC code to model cloud dynamics, it takes up to 20 min for a single run on a mainframe computer. Results from a number of runs have been generalized into empirical formulae. From these results it is possible to estimate worst case gamma radiation doses for complex scenarios using a hand calculator. GRA

N87-10712# Army Research Inst. of Environmental Medicine, Natick, Mass.
A SYSTEM FOR CONTROLLED PRESENTATION OF THE ARDEN CONTRAST SENSITIVITY TEST
J. L. KOBRICK, H. I. ZELTZER, and S. MULLEN Dec. 1985 14 p
(AD-A167969; USARIEM-T-3/86) Avail: NTIS HC A02/MF A01 CSCL 06E

Contrast sensitivity has been identified as a significant index of visual function, and as an indicator of visual disorders. The Arden test of contrast sensitivity has been recognized as a simple and easily administered technique for measurement of this process. However, this test involves manual manipulation and considerable individual subjectivity. The instrument described in this report was designed and developed to eliminate variability in the testing procedure due to differences in individual testing techniques, and to standardize testing conditions, ambient illumination, viewing distance and presentation rates. GRA

N87-10713# Pacific Northwest Labs., Richland, Wash.
COMPARISON OF THE COUPLING OF GROUNDED AND UNGROUNDED HUMANS TO VERTICAL 60-HZ ELECTRIC FIELDS
W. T. KAUNE, L. M. KISTLER, and M. C. MILLER Dec. 1985 26 p Presented at the 24th Hanford Life Sciences Symposium on Health and Environmental Research on Complex Organic Mixtures, Richland, Wash., 21 Oct. 1985
(Contract DE-AC06-76RL-01830)
(DE86-011140; PNL-SA-13600; CONF-851027-11) Avail: NTIS HC A03/MF A01

Total induced currents and average induced axial current densities have been published in the literature for human models exposed to 60-Hz electric fields. The results of these studies have been quite useful, but they deal with a somewhat idealized exposure situation that ignores the insulating effects of most types of footwear. This paper describes a new laboratory technique for studying the relationship between grounded and ungrounded exposure of humans. A conducting model of the body 40-cm-tall man was electrically divided into seven segments. Wires connected to the conducting surfaces of these segments were routed horizontally through shielded cable to remote, battery-powered electronics. The common potential of the electronics was biased to the electric-field-induced potential of the model, allowing us to accurately measure the current induced in each body segment of the model. The method was tested by measuring the current induced in the upper hemisphere of a ungrounded sphere. Agreement between theory and measurement was excellent. Measurements were made with the human mod el located at 15 positions, ranging from touching ground to remote from ground (i.e., in free space). The ratios of free-space to grounded currents crossing horizontal sections through the body were: neck, 0.58; chest, 0.40; abdomen, 0.39; thigh, 0.36; ankle, 0.17. DOE

N87-11481*# Umpqua Research Co., Myrtle Creek, Ore.
A PROTOTYPE SPACE FLIGHT INTRAVENOUS INJECTION SYSTEM Final Report
G. V. COLOMBO May 1985 65 p
(Contract NAS9-16337)
(NASA-CR-171911; NAS 1.26:171911) Avail: NTIS HC A04/MF A01 CSCL 06E

Medical emergencies, especially those resulting from accidents, frequently require the administration of intravenous fluids to replace lost body liquids. The development of a prototype space flight intravenous injection system is presented. The definition of requirements, injectable concentrates development, water polisher, reconstitution hardware development, administration hardware development, and prototype fabrication and testing are discussed. B.G.

N87-11482# Army Research Inst. of Environmental Medicine, Natick, Mass.
PREDICTION OF THE METABOLIC COST OF EXERCISE FROM MEASUREMENTS DURING RECOVERY
S. LEGG, J., J. DZIADOS, R. MELLO, J. A. VOGEL, and T. J. DOHERTY Mar. 1986 19 p
(AD-A168076; USARIEM-M-24/86) Avail: NTIS HC A02/MF A01 CSCL 06P

This study was designed to determine if post exercise recovery measurements could be used to predict the oxygen uptake (VO2), minute ventilation (V sub E) and heart rate (HR) during exercise. VO2, V sub E and HR were measured in 11 healthy males during the last minute of treadmill running (at various exercise intensities ranging from light to maximal effort) and for each 15 second period during three minutes of standing recovery. For each variable measured, a least squares regression line was calculated from data collected during the interval between 15 and 60 seconds after cessation of exercise. The ability of the Y intercept of this line, denoted B sub O, to predict the observed last-minute exercise value, denoted Y sub O, was enhanced by one of two distinct methods. For VO2 and HR, a linear least squares regression between Y sub O and B sub O was used to calculate correction co-efficients. The linear regression co-efficients of (B sub O - Y sub O) versus the slope (B sub 1) of the original regression line enhanced the prediction of the observed exercise level of V sub E. In a separate validation experiment using 6 different males, the mean predicted values for VO2, V sub E and HR differed from observed last minute exercise values. It is concluded that the equations described in this study, utilising data collected during the first minute of recovery from exercise, may be useful in estimating the metabolic cost of exercise. GRA

53

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

A87-10567
A PROJECTIVE TEST APPLIED IN PSYCHOLOGICAL TESTING OF MILITARY FLIGHT PERSONNEL - THE AERO TAT [ETUDE D'UN TEST PROJECTIF APPLIQUEE A L'EXAMEN PSYCHOLOGIQUE DU PERSONNEL NAVIGANT MILITAIRE - L'AERO T.A.T.]
M. BOUFFARD (Centre Medical de Psychologie Clinique de l'Armee de l'Air, Paris, France) and J. R. GALLE-TESSONNEAU (Service de Sante pour l'Armee de l'Air Ecole d'Application; Centre Medical de Psychologie Clinique de l'Armee de l'Air, Paris, France) Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 134-139. In French.

The usage of the Thematic Apperception Test in the process of selecting pilots is described. Pilot candidates are presented with nine pictorial renderings of situations relevant to the life of a pilot and one blank slate. The pictures include, e.g., a boy with a model aircraft, a woman and child viewing a jet aircraft from a distance, and the face of a pilot an instant before a crash. The pilot must develop a 'lively' story for each picture, plus a story and a picture to go with it for the blank. Theoretically, there is a correspondence between the stories that are told, the way they are told, and the daily life of the teller. The replies are evaluated with respect to criteria of flight aptitude, the reason the test is being given, and the type of flight duty. The various ways in which certain story items, or the style in which the story is told, affect a flight fitness decision are summarized. M.S.K.

A87-10570
MENTAL WORKLOAD, THE VALIDATION IN FRANCE OF AN AMERICAN SUBJECTIVE TECHNIQUE - SWAT [CHARGE DE TRAVAIL MENTAL, VALIDATION EN FRANCE D'UNE TECHNIQUE D'EVALUATION SUBJECTIVE AMERICAINE - SWAT]
R. AMALBERTI, D. BATEJAT, M. BATAILLE, J. P. MENU, and G. SANTUCCI (Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris, France) Medecine Aeronautique et Spatiale, vol. 25, 2nd Quarter, 1986, p. 148-153. In French. refs

The Subjective Workload Assessment Technique (SWAT) is described and the results of tests of its effectiveness are reported. SWAT was devised for evaluations of mental workload in terms of participant subjective assessments of the time, effort and stress associated with particular tasks. The effort, time, and stress are each assigned a scaled rating of weak, average or strong. The SWAT method was validated for use with French pilots by having 15 pilots perform a monitoring task for signal anomalies while responding to a radio message. Both tasks had several levels of difficulty. The results showed higher levels of difficulty for higher complexity, which validated the technique. Further evaluations, in the form of comparisons with performance data, are needed before SWAT becomes standardized. M.S.K.

N87-11483# Gulf and Western Applied Science Labs., Waltham, Mass.
RESEARCH IN THE AREA OF VISUAL SEARCH Final Report, 1 Jun. 1983 - 31 May 1986
L. F. SCINTO Jun. 1986 7 p
(Contract DAAG29-83-C-0014)
(AD-A168923; ARO-20540.2-LS) Avail: NTIS HC A02/MF A01 CSCL 06P

The research sought to explicate a model of human visual search activity and identify those variables that affect effective visual search. It was also possible to develop and enhance the hardware and software capabilities central to research in the area of visual information processing. This research also addressed significant methodological issues in the analysis of eye movement data. GRA

N87-11484# British Aerospace Public Ltd. Co., Bristol (England). Human Factors Dept.
THE EFFECTS OF TERRAIN CLUTTER ON OBSERVER BEHAVIOUR DURING SEARCH OF COMPLEX SCENERY
L. K. B. HOLMAN Aug. 1982 32 p
(BAE-BT-13535; LR46994; ETN-86-97957) Avail: NTIS HC A03/MF A01

An experiment on visual search in complex scenes was conducted, using a technique for measuring eye movements. Results were used to devise a means to divide scenes into clutter and nonclutter regions. It is shown that 85% of fixations fall within the clutter regions. The ratio of fixation density in clutter versus nonclutter regions corresponds well with target acquisition performance and it is suggested that measures of clutter area and clutter distribution could be used in the prediction of search performance. A suite of programs for microcomputers was written as an aid to the analysis of eye movement studies. ESA

N87-11485# British Aerospace Public Ltd. Co., Bristol (England).
AIR-TO-GROUND TARGET ACQUISITION IN THE PRESENCE OF SENSOR VIBRATION
G. J. DEAN Jan. 1983 43 p
(BAE-BT-14222; LR48619; ETN-86-97963) Avail: NTIS HC A03/MF A01

The effect of pitch and roll movements of an airborne sensor relaying information to a remote ground station, an observers' target detection ability was studied using a flight simulator. Such movements may be attributed to wind gusting or coupled vibration. Sixteen video films were shown to each observer and each film contained 15 target tanks to be located. Results show a definite, but not great, decline in the number of correct designations made as pitch and roll increase: from 368 targets correctly designated in the vibration-free condition, to 291 designated in the highest vibration condition. The number of incorrect designations increases as vibration becomes greater. The total number of designations made declines as vibration increases. ESA

N87-11486# Technische Hogeschool, Delft (Netherlands). Dept. of Mathematics and Informatics.
ON ACTIONS DUE TO LACK OF INFORMATION
B. G. LUNDBERG 1985 19 p
(REPT-85-45; ETN-86-98475) Avail: NTIS HC A02/MF A01

The problem of making conclusions from representations of knowledge is analyzed. Conclusion-making due to lack of information is studied. The concepts of immediately available information, assumptionally inferable information, and constructively inferable information are introduced. It is shown that it is important to specify the assumptions that are made about a representation, in particular with respect to the conclusions that can be made from the representation. For constructively inferable information, it is shown that the lack of information can only be used to select which among a set of possible conclusions to make. ESA

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

A87-10172
BRAIN BUCKETS
C. V. GLINES Air Force Magazine (ISSN 0730-6784), vol. 69, Aug. 1986, p. 86-90.

The development of helmets for aircraft pilots is examined. The initial use of football helmets and soft leather helmets and goggles, and the incorporation of oxygen mask and headsets into the design of the helmet are discussed. With the evolution of jet fighter and bomber aircraft fiberglass hard hats for pilots were introduced. Following the testing of various designs, helmets were custom fitted to each pilot for maximum protection and comfort during aircraft maneuvering and acceleration. Various methods for alleviating the noise interference problem are considered. The development of a helmet with a head cooling system for helicopter aircrew, a helmet with a rotating sound protective earcup to reduce outside noise interference, and the Integrated Chemical Defense System designed to protect against chemical and biological contamination is described. The development of a Visually Coupled Airborne Systems Simulator with a display in front of the pilots eyes and eye, hand, and voice command activation for use in flight simulators and future high-performance aircraft is currently being studied. I.F.

A87-11133
A CONCEPTUAL MODEL FOR PREDICTING PILOT GROUP G TOLERANCE FOR TACTICAL FIGHTER AIRCRAFT
R. R. BURTON (USAF, School of Aerospace Medicine, Brooks AFB, TX) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, Aug. 1986, p. 733-744. refs

A static model based on eye-heart vertical distance has been developed which predicts group mean G tolerances relative to the application of any of the following anti-G methods and/or physiologic responses: (1) anti-G suit, (2) reclined seat, (3) anti-G straining maneuver (AGSM), (4) positive pressure breathing (PPB), (5) gradual onset of G, (6) isometric muscular contractions, and (7) leg elevation. This model was validated with published data. A variation of this model (derived equation) predicts the amount of AGSM (in mm Hg) required, in combination with any of the anti-G methods/responses at any G level. This calculated effort of AGSM can be equated to level of fatigue and performance decrements. A level of 50 mm Hg or an increase of 2 G in the upright seat was the maximum AGSM recommended for routine use as an anti-G method for operational fighter pilots. Author

A87-11139
COMPARATIVE EFFECTS OF WHOLE-BODY VIBRATION ON SENSORIMOTOR PERFORMANCE ACHIEVED WITH A MINI-STICK AND A MACRO-STICK IN FORCE AND POSITION CONTROL MODES
E. RIBOT, J. P. ROLL, and G. M. GAUTHIER (Aix-Marseille I, Universite, Marseille, France) Aviation, Space, and Environmental Medicine (ISSN 0095-6562), vol. 57, Aug. 1986, p. 792-799. Research supported by Aerospatiale and CNRS. refs

The aim of this investigation was to assess the performance of subjects in a target recentering task, performed under both normal and vibration conditions. A conventional helicopter stick and an arm-side controller were used in both position and force control modes. The task was designed to simulate instrument flying. The results showed that in the no-vibration situation, the highest performance was achieved in the force control mode and little difference was observed between the two sticks. They also showed that vibration impaired the velocity control of the performance. It is suggested that the subject might be switching over from a visual and arm afferent and efferent control in the no-vibration situation, to a visual control only under vibration condition. From this study, it appears that the more efficient stick to execute the designed task is the mini-stick operating in the force control mode. Author

A87-11209
THE MICROWAVE PROBLEM
K. R. FOSTER (Pennsylvania, University, Philadelphia) and A. W. GUY (Washington, University, Seattle) Scientific American (ISSN 0036-8733), vol. 255, Sept. 1986, p. 32-39.

No firm biophysical data have been found to support a definite lower limit to microwave exposure below which no harm can occur in humans. The means by which hazardous levels have been identified are reviewed, along with the techniques being applied to establish new, lower acceptable radiation levels in the U.S. The military exerted the original efforts to define exposure limits to assess health risks for radar operators. The first public exposure limits were an average power density of 100 W/sq m. Recent ANSI recommendations are to lower the levels to about 0.4 W per kg of body weight, a figure weighted by the frequency used. It has experimentally been proven that bursts of 10-500 kW microwave energy produce audible clicks in a human head because of the thermal expansion of tissue. Continued exposure to the new ANSI standard has been experimentally shown to cause malignant tumors in rats. The EPA is currently reviewing the available data as a prelude to promulgating new regulations in 1987. M.S.K.

A87-12216*# Search Technology, Inc., Norcross, Ga.
HUMAN FACTORS OF INTELLIGENT COMPUTER AIDED DISPLAY DESIGN
R. M. HUNT (Search Technology, Inc., Norcross, GA) IN: Annual Aerospace Applications of Artificial Intelligence Conference, 1st, Dayton, OH, September 16-19, 1985, Proceedings . Dayton, OH, AAAIC Secretariat, 1985, p. 173-181. refs
(Contract NAS1-17874)

Design concepts for a decision support system being studied at NASA Langley as an aid to visual display unit (VDU) designers are described. Ideally, human factors should be taken into account by VDU designers. In reality, although the human factors database on VDUs is small, such systems must be constantly developed. Human factors are therefore a secondary consideration. An expert system will thus serve mainly in an advisory capacity. Functions can include facilitating the design process by shortening the time to generate and alter drawings, enhancing the capability of breaking design requirements down into simpler functions, and providing visual displays equivalent to the final product. The VDU system could also discriminate, and display the difference, between designer decisions and machine inferences. The system could also aid in analyzing the effects of designer choices on future options and in ennunciating when there are data available on a design selections. M.S.K.

A87-12450
ORGANIZATION OF A BIOFEEDBACK SYSTEM ON THE BASIS OF A LABORATORY MICROCOMPUTER SYSTEM [ORGANIZATSIIA BIOTEKHNICHESKOI OBRATNOI SVIAZI NA OSNOVE LABORATORNOI MIKROKOMP'UTERNOI SISTEMY]
S. V. ASTAFEV, B. N. DERII, E. M. SOKHADZE, V. P. TRETIAKOV, M. B. SHTARK et al. Avtometriia (ISSN 0320-7102), May-June 1986, p. 15-23. In Russian. refs

The paper describes the hardware and software features of a microcomputer system with advanced graphics that makes it possible to realize multipurpose biofeedback. A procedure for the biofeedback control of cardiovascular indices is described, and the possibility of using the proposed approach to study the central control and regulation mechanisms of various human physiological systems is examined. The large potential of the biofeedback system is noted. B.J.

A87-12851
MICROORGANISMS IN ARTIFICIAL ECOSYSTEMS [MIKROORGANIZMY V ISKUSSTVENNYKH EKOSISTEMAKH]
B. G. KOVROV, ED. and V. A. KORDIUM, ED. Novosibirsk, Izdatel'stvo Nauka, 1985, 192 p. In Russian. For individual items see A87-12852 to A87-12879.

The processes of nutrient turnover in closed ecosystems are considered, with special attention given to the growth of plants and bacteria under space flight conditions and in space-flight-simulating environments. The topics discussed include the effect of space flight conditions on higher plants, unicellular algae as a photosynthetic link in an ecological system, model studies of bioengineering life support systems, and processes and instrumentation in biological technology. Papers are also presented on the ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity, adaptation of unicellular algae and higher-plants tissue cultures to hypogravity, cellular regulation of the synthesis of ribulose-1,2-diphosphate carboxylase and its subunits, gas balance in the electrolysis/hydrogen bacteria, and a mathematical model for the oxidation of wheat straw by microorganisms. Consideration is also given to prolonged storage of unicellular algae collections without periodic reseeding, a study of the biological value of decolorized algae (scenedesmus) in an experiment with animals, and the use of edible higher fungi in artificial ecosystems which include man. I.S.

A87-12872
THE USE OF THE DOMINANT-INDEX PRINCIPLE TO DEVELOP COMPLEX BIOENGINEERING LIFE-SUPPORT SYSTEMS [ISPOL'ZOVANIE PRINTSIPA DOMINIRUIUSHCHEGO POKAZATELIA DLIA FORMIROVANIIA SLOZHNYKH BIOTEKHNICHESKIKH SISTEM ZHIZNEOBESPECHENIIA]
V. N. DANILOV, L. E. LIKHOGRUDOVA, A. L. MASHINSKII, and V. I. TRAVKIN IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 103-115. In Russian. refs

The present study proposes a method for developing versions of bioengineering life-support systems which are evaluated according to a set of dependent indices in the presence of the indeterminacy of the system structure and incomplete data on quantitative evaluations of the system elements according to the indices. The chief terms of the method are defined, including structural indeterminacy, dependence of indices, incompleteness of information, and indeterminacy of preferences. Information support for the problem of constructing a given number of most preferable versions of the system is considered; a procedure for constructing a given number of effective versions of the system is described; and a formal statement of the problem is given. B.J.

A87-12873
THE GAS BALANCE IN AN ELECTROLYSIS/HYDROGEN BACTERIA SYSTEM [GAZOVYI BALANS V SISTEME ELEKTRALIZ-VODORODNYE BAKTERII]
IA. V. SEMENOV, A. V. GOLUBKOVICH, S. K. REVENKO, M. A. PALEEVA, and M. A. BORUZDINA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 115-117. In Russian.

The coefficients of gas assimilation were determined in cultures of hydrogen oxidizing bacteria grown in suspensions containing between 5 and 25 g dry mass/1 in the apparatus described by Semenov and Petrova (1978). It was found that under growth conditions (30.0 C and pH 6.8) the values of the gas assimilation coefficient corresponded to the respiratory coefficients in humans when the bacterial suspensions contained from 5.5 to 20.6 g dry mass/1. It is suggested that, in the life support systems which use hydrogen bacteria for oxygen production, the values of the gas assimilation coefficient can be regulated by varying the concentration of the biological mass in the suspension. I.S.

A87-12874
THE POSSIBILITY OF USING CULTURED CELLS OF HIGHER PLANTS IN LIFE SUPPORT SYSTEMS [VOZMOZHNOSTI PRIMENENIIA KUL'TUR KLETOK VYSSHIKH RASTENII V SISTEMAKH ZHIZNEOBESPECHENIIA]
P. G. SIDORENKO, G. M. MARTYN, G. G. MIKELADZE, and A. G. PODLUTSKII IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 117-121. In Russian. refs

The ultrastructural characteristics, nutrient contents, and taste of cellular biomasses obtained from cultured cells of soya bean, Jerusalem artichoke, dill, broccoli, and basil plants were investigated for the purpose of finding edible cultures for use in life support systems. All cultured cells grew well, displayed morphological features indicating the presence of active biosynthesis and nutrient storage, and were edible either raw or after light processing. The protein contents in cells of soya bean and Jerusalem artichoke were found to be 12.16 and 13.34 percent, respectively. I.S.

A87-12875
BIOTESTING OF THE ATMOSPHERE OF A CLOSED ECOSYSTEM BY MEANS OF MICROORGANISMS [BIOTESTIROVANIE ATMOSFERY ZAMKNUTOI EKOSISTEMY S POMOSHCH'IU MIKROORGANIZMOV]
B. G. KOVROV and L. S. TIRRANEN IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 121-124. In Russian. refs

The possibility of detecting toxic contaminants in a closed ecological system by following the growth characteristics of microbial cultures was investigated, using bacterial strains which differed in their sensitivity to water-soluble poisons produced by a closed ecosystem. Up to 50 different microbial species were planted in each test dish, using the replica method, after the nutrient agar was exposed to the atmosphere of a closed system for one or two days, the diameters of the respective colonies being taken as the parameters of cell growth. Growth of 51 out of the 75 bacterial cultures tested was seen to be retarded by the exposure to a closed atmosphere. Adding a thermocatalytic component decreased the growth inhibiting effect of the closed system, but did not eliminate the effect completely. I.S.

A87-12876
THE USE OF HIGHER EDIBLE FUNGI IN ARTIFICIAL ECOSYSTEMS THAT INCLUDE MAN [K VOPROSU OB ISPOL'ZOVANII VYSSHIKH S'EDOBNYKH GRIBOV V ISKUSSTVENNYKH EKOSISTEMAKH, VKLIUCHAIUSHCHIKH CHELOVEKA]
I. I. PANKOVA, I. N. TRUBACHEV, G. I. KOCHETOVA, N. S. MANUKOVSKII, IU. I. BAIANOVA et al. IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 124-130. In Russian. refs

The nutrient contents and growth characteristics of edible higher fungi which can be cultivated on wheat straw as a nutrient were studied with the aim of finding suitable species for inclusion into the closed ecosystem of a spaceflight. The fungi, which included five types of common edible mushrooms, were grown on presterlized straw, and the relative characteristics of the biomass, the lignolytic activity, the nutrient contents, and the stability of growth were assessed. The major problem in the use of higher fungi in a closed system is seen in the difficulty of sterilizing the substrate and maintaining its sterility, both necessary for obtaining a normally developing micellium. I.S.

A87-12877
ESTIMATING THE BIOMASS AND THE ENERGY CONTENTS OF CHLORELLA USING THE 'MAN-ALGAE MINERALIZATION' MODEL OF A BIOLOGICAL LIFE SUPPORT SYSTEM [OTSENKA SOSTAVA BIOMASSY KHLORELLY I EE ENERGOSODERZHANIIA V MODELI BSZHO 'CHELOVEK-VODOROSLI-MINERALIZATSIIA']
A. A. ANTONIAN and N. I. SUKHOVA IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 134-137. In Russian.

A87-12878
AN APPROXIMATION METHOD FOR STUDYING THE PRODUCTIVITY DYNAMICS OF A BIOLOGICAL LIFE SUPPORT SYSTEM WHEN CHANGING THE OPERATING MODE [PRIBLIZHENNYI METOD ISSLEDOVANIIA DINAMIKI PROIZVODITEL'NOSTI BIOLOGICHESKOI SISTEMY ZHIZNEOBESPECHENIIA PRI IZMENENII REZHIMA RABOTY]
IN: Microorganisms in artificial ecosystems . Novosibirsk, Izdatel'stvo Nauka, 1985, p. 137-143. In Russian.

An approximation method is presented for theoretical studies of the productivity dynamics of biological life support systems during changes in their operating mode. The accuracy of the method was assessed using a mathematical model of a system based on a culture of a unicellular alga. The method can be used for assessing the functional efficiency of biological life-support systems. I.S.

A87-12879
FORMATION OF A MICROBIAL CENOSIS IN THE PHOTOAUTOTROPHIC COMPONENT OF A BIOLOGICAL SYSTEM OF HUMAN LIFE-SUPPORT [FORMIROVANIE MIKROBNOGO TSENOZA FOTOAVTOTROFNOGO ZVENA V BIOLOGICHESKOI SISTEME ZHIZNEOBESPECHENIIA CHELOVEKA]
L. S. IUNUSOVA, E. M. KONDRATEVA, and N. A. DRUGOVA IN: Microorganisms in artificial ecosystems . Novisibirsk, Izdatel'stvo Nauka, 1985, p. 143-146. In Russian.

The effect of changing some conditions of a closed biosystem on the microbial florae accompanying growing wheat plants and a Chlorella pyrenoidosa culture were studied while the plants were grown autonomously and after they were connected with other components of a closed ecosystem which included human, wheat, algal, and mineral components. The population of the microorganisms accompanying wheat plants was maximal in numbers and activity on the 26th-29th day of development, with only small increases seen after the connection with other system components. In the algal culture, the number of bacteria varied from 300 to 900 million/ml, the increased populations occurring after the cultures were connected with the higher plant and the mineralization components. Including the human component in the system led to slight increases in the numbers of lower fungi, such as Penicillium, Aspegillus, and yeastlike fungi, but the sporadic appearance of these fungi did not affect the activity of the microbial flora in the plant growth media. I.S.

N87-10648# Zurich Univ. (Switzerland). Central Biological Lab.
LIFE EXPECTANCY IN TROPICAL CLIMATES AND URBANIZATION
W. H. WEIHE *In* WMO Proceedings of the Technical Conference on Urban Climatology and its Applications with Special Regard to Tropical Areas p 313-353 1986
Avail: NTIS MF A01; print copy available at WMO, Geneva, Switzerland

Demographic data, mortality levels, and trends are studied analyzing urban-rural and latitudinal gradient situations. The distribution of the causes of death and its correlation with climatic factors are examined. Heat tolerance levels suggest tropical cities as death islands when they are too large, dense, with short distances between buildings, and little green land. The build-up of heat islands becomes a threat in tropical climates. ESA

N87-10649# World Meteorological Organization, Geneva (Switzerland).
HUMAN COMFORT IN THE URBAN TROPICS
L. SANCHEZDECARMONA *In its* Proceedings of the Technical Conference on Urban Climatology and its Applications with Special Regard to Tropical Areas p 354-404 1986
Avail: NTIS MF A01; print copy available at WMO, Geneva, Switzerland

Factors dictating thermal and climatic well being in tropical regions are analyzed. Measurements are mainly made in cities outside the tropics but the findings may be applied to cities in the tropics by careful transposition. Environmental pollution is studied as a factor which threatens the well being of urban populations. Specific possibilities and measures for improving thermal comfort in the urban humid tropics are suggested. It is shown that the climate may be controlled using the elements of nature (wind, radiation, vegetation), thus avoiding the use of costly technology-intensive devices. ESA

N87-10714# Anacapa Sciences, Inc., Fort Rucker, Ala.
HUMAN FACTORS RESEARCH IN AIRCREW PERFORMANCE AND TRAINING Annual Summary Report, 1 Sep. 1982 - 31 Aug. 1983
K. D. CROSS Dec. 1985 135 p
(Contract MDA903-81-C-0504; DA PROJ. 2Q2-63731-A-792; DA PROJ. 2Q2-63731-A-793)
(AD-A167950; ASI-479-19-1; ARI-RN-85-104) Avail: NTIS HC A07/MF A01 CSCL 05E

This report presents Human Factors Research in Aircrew Performance and Training for the Army Research Institute Field Unit at Fort Rucker, Ala. The report contains summary descriptions for each of the 19 projects on which the ASI personnel worked during the second contract year. Each summary description contains: (1) a background section that describes the rationale for the research need and the project objectives, (2) a research approach section that describes the tasks and activities required to fulfill the project objectives, and (3) a project status section that describes the work completed, preliminary findings (if available), and the anticipated project completion date. GRA

N87-11487# Human Engineering Labs., Aberdeen Proving Ground, Md.
ANTHROPOMETRIC CONSIDERATIONS FOR A FOUR-AXIS SIDE-ARM FLIGHT CONTROLLER Final Report
W. B. DEBELLIS and K. A. CHRIST Feb. 1986 22 p
(AD-A168135; HEL-TN-2-86) Avail: NTIS HC A02/MF A01 CSCL 06N

This report describes the physical conditions of a multiaxis side-arm flight controller and armrest which were selected as being comfortable by a sample of 77 nonpilot and pilot personnel. Data are presented for males and females, right- and left-handed personnel, pilots and nonpilots, and pilots wearing and not wearing chemical-biological (CB) protective gear. Generally, the comfort range for the various armrest and flight controller parameters, as selected by nonpilot, male personnel, is sufficiently broad to include the effects of gender, handedness, protective clothing, and pilot experience. GRA

N87-11488# California Univ., Los Angeles. Motor Control Lab.
CONTROLLING THE TEMPORAL STRUCTURE OF LIMB MOVEMENTS: A RESPONSE Interim Report, period ending Jun. 1985
R. A. SCHMIDT May 1986 11 p
(Contract MDA903-85-K-0225; DA PROJ. 2Q1-61102-B-74-F)
(AD-A169261; ARI-RN-86-67) Avail: NTIS HC A02/MF A01 CSCL 06P

This report is a response to a recent article by Berkinblit, et.al., which suggested that motor-program models, in which a centrally programmed temporal structure was a key ingredient, seemed incorrect. In particular, Schmidt takes issue with their discussion of Fel'dman's (1974) mass-spring model which denies a central program for limb movement timing and amplitudes. Schmidt argues

that evidence for unidirectional actions and sequential movements limits the utility of the mass-spring model. GRA

N87-11489# Pacific Northwest Labs., Richland, Wash.
DEVELOPMENT OF AN EXPERT SYSTEMS COMPUTER PROGRAM FOR CONTROL PANEL DESIGN ENHANCEMENT
A. L. FRANKLIN, P. J. PELTO, and B. A. FECHT May 1986 15 p Presented at the Personal Computers: Gas Industry Applications, Las Vegas, Nev., 18 Jun. 1986
(Contract DE-AC06-76RL-01830)
(DE86-012153; PNL-SA-14013; CONF-860658-1) Avail: NTIS HC A02/MF A01

The control panel is the principal human/machine interface and is a key system in assuring the safe and reliable operation of a gas industry facility. The majority of gas industry facilities use hardwired control and display systems. Many newer facilities (and some existing facilities) are installing computer-aided control and display systems. In work conducted for the Gas Research Institute, Battelle Northwest has developed human factors guidelines for hardwired (DeSteese et al. 1982) and computer-aided (Fecht et al. 1985) control and display systems. The guidelines themselves represent only a fraction of the total information gained during this research activity. Recent developments in the area of artificial intelligence provide a novel means for transferring and sharing expertise gained in developing these guidelines. A proof of principle expert system has been developed to demonstrate the practicality of using an expert system to record and communicate information traditionally presented in manuals and reports. The nature of expert systems not only provides a convenient means for communicating abstract concepts such as expertise and insight, but it also provides aninteractive medium where user access becomes more conversation like. In essence, the manual becomes a mimic of the expert that compiled the information found in the manual. In addition, with an animated or smart manual, the manual itself can become involved in the panel design process by suggesting areas where additional design consideration may be justified. DOE

N87-11490# British Aerospace Public Ltd. Co., Bristol (England). Applied Optics Research Dept.
AN EXPERIMENTAL DESIGN FOR COLOUR SENSITIVITY IN TARGET ACQUISITION
P. L. PHILIPS Dec. 1981 51 p
(BAE-BT-12489-VOL-1; LR46186-VOL-1; ETN-86-97955) Avail: NTIS HC A04/MF A01

An algorithm which represents color discrimination thresholds in a three-dimensional metric color space is described. It is suitable for the design of color sensitivity experiments with display systems. The well-established algorithm for the matching tolerances of large color patches (greater than or = 35 milliradians) was extended to include the effects of small targets down to 1 milliradian. Allowance is made for color vision deficiencies exhibited with normal observers when viewing small target sizes. Variations with target size are very relevant to tolerancing displays in military systems. Experiments to test assumptions made in estimating the magnitude of the algorithm's coefficients, particularly when considering the extrapolation of existing data to differing regions of color space, effects of localized chromatic adaptation of the observer, and the texture interaction between target and background are proposed. ESA

N87-11491# British Aerospace Public Ltd. Co., Bristol (England). Applied Optics Research Dept.
AN EXPERIMENTAL DESIGN FOR COLOUR SENSITIVITY IN TARGET ACQUISITION, VOLUME 2
P. L. PHILIPS Dec. 1981 30 p
(BAE-BT-12489-VOL-2; LR46186-VOL-2; ETN-86-97956) Avail: NTIS HC A03/MF A01

Coefficients for a color discrimination algorithm; MacAdam's geodesic chromaticity diagram; a transformation of Noorlander's et al (1980) data; a transformation of axes for ellipsoid cross sections; 50% probability loci for fit to Noorlander data; and solving the color discrimination algorithm for particular luminance-chromaticity combinations or chromaticity planes are covered. ESA

55

SPACE BIOLOGY

Includes exobiology; planetary biology; and extraterrestrial life.

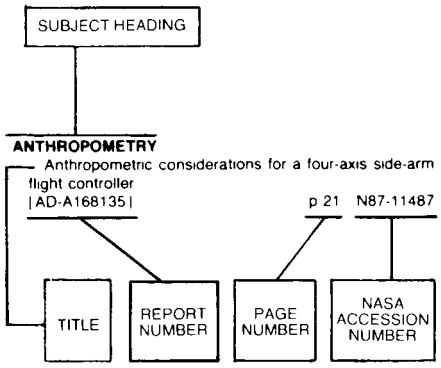
A87-10197
RNA AND HOT-WATER SPRINGS
E. G. NISBET (Saskatchewan, University, Saskatoon, Canada) Nature (ISSN 0028-0836), vol. 322, July 17, 1986, p. 206. refs

The possible origin of life starting from the inorganic construction of an RNA chain in a hydrothermal system is discussed. Since RNA has the ability to splice out a length of itself, it serves as both a list of instructions and as the means of replicating those instructions. A shallow-level hydrothermal system would fulfill the requirement of a local degree of order that would permit the RNA molecule to assemble and detach daughter ribozymes while still retaining access to them. Hydrothermal systems have the additional advantage of carrying large quantities of phosphorus and inorganic catalysts. Altered basalts and pillow breccia containing zeolite minerals and having water flow-through could provide such a setting favorable to the origin of life. C.D.

A87-12200
A LABORATORY EXPERIMENT WITH RELEVANCE TO THE SURVIVAL OF MICRO-ORGANISMS ENTERING A PLANETARY ATMOSPHERE
S. AL-MUFTI, F. HOYLE, and N. C. WICKRAMASINGHE (University College, Cardiff, Wales) Earth, Moon, and Planets (ISSN 0167-9295), vol. 36, Sept. 1986, p. 89-91.

A culture of E.coli was initially subjected to brief exposures to heat for durations of 30-60 s, starting with a temperature of 270 C. A stepwise increase of this temperature from 270 C-750 C and a sequential culturing led to the emergence of a strain of this bacterium with a much higher resistance to flash heating than the original culture possessed. This behavior would have an important relevance to the survival of micro-organisms upon entering a planetary atmosphere. Author

Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

ABIOGENESIS
RNA and hot-water springs --- hypothetical environments for origin of life p 22 A87-10197
ACCELERATION STRESSES (PHYSIOLOGY)
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
ACCELERATION TOLERANCE
A conceptual model for predicting pilot group G tolerance for tactical fighter aircraft p 19 A87-11133
Women's G tolerance p 10 A87-11134
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
ACTIVITY (BIOLOGY)
The effect of illumination on the antibacterial activity of microalgae p 5 A87-12864
ACTIVITY CYCLES (BIOLOGY)
Ultradiant rhythms in physiology and behavior --- Book p 1 A87-10298
ADAPTATION
General-biological character of the adaptive capacities of the metabolism of mammals in response to different extreme environmental factors p 1 A87-10440
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862
Adaptation of humans and animals to extreme environmental conditions p 7 A87-12918
The physiological mechanisms of adaptation to hypoxia p 7 A87-12919
The thermoregulatory characteristics of inhabitants of different climatic-geographical regions during adaptation to moderate climate p 12 A87-12923
Functions of the human organism during prolonged stay and work in extreme conditions of caves p 12 A87-12924
Adaptation and biorhythms p 7 A87-12925
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709
ADENOSINE TRIPHOSPHATE
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
ADHESION
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
AEROEMBOLISM
Respiratory mechanics in men following a deep air dive p 11 A87-11659
AEROSPACE MEDICINE
Mechanical solid vibrations. II - Low and high frequency vibrations p 10 A87-10571
Women's G tolerance p 10 A87-11134
Aerospace medicine and biology: A continuing bibliography with indexes | NASA-SP-7011(289) | p 12 N87-10674
Space motion sickness p 15 N87-10693
USSR Space Life Sciences Digest, issue 8 | NASA-CR-3922(09) | p 8 N87-11478
A prototype space flight intravenous injection system | NASA-CR-171911 | p 17 N87-11481
AIR POLLUTION
Biotesting of the atmosphere of a closed ecosystem by means of microorganisms p 20 A87-12875
AIRCRAFT PILOTS
Brain buckets --- development of helmets for aircraft pilots p 19 A87-10172
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564
Sickle cell disease and flight personnel p 9 A87-10565
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139
ALDOSTERONE
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
ALGAE
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
Compounds of steroid nature in unicellular algae p 5 A87-12861
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862
The effect of illumination on the antibacterial activity of microalgae p 5 A87-12864
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of Closteriopsis acicularis var. africana Hind. p 6 A87-12867
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868
Mineral nutrition of dense populations of Euglena p 6 A87-12869
The gas exchange characteristics of an intensive culture of Closteriopsis acicularis var. africana Hind. p 6 A87-12870
ALTITUDE ACCLIMATIZATION
Control of ventilation in extreme-altitude climbers p 11 A87-11654
Morphofunctional indices of animals' individual resistance to hypoxia p 7 A87-12921
ALTITUDE SIMULATION
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
ALTITUDE TOLERANCE
Sickle cell disease and flight personnel p 9 A87-10565
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573
AMINO ACIDS
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
AMPHETAMINES
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
ANGINA PECTORIS
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber p 16 N87-10702
ANIMALS
Adaptation of humans and animals to extreme environmental conditions p 7 A87-12918
Animal models in space physiology p 8 N87-10705
ANTARCTIC REGIONS
Bacteria of the Pseudomonas genus isolated from the ice sheet of an Antarctic glacier p 6 A87-12888
ANTHROPOMETRY
Anthropometric considerations for a four-axis side-arm flight controller | AD-A168135 | p 21 N87-11487
ANTIBODIES
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680
ANTIGRAVITY
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans --- Plasma Renin Activity and Plasma VasoPressin p 11 A87-11660
ANTIRADIATION DRUGS
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
APPROXIMATION
An approximation method for studying the productivity dynamics of a biological life support system when changing the operating mode p 21 A87-12878
ARM (ANATOMY)
Anthropometric considerations for a four-axis side-arm flight controller | AD-A168135 | p 21 N87-11487
ASYMMETRY
Physical causes of the asymmetry of living systems --- Russian book p 2 A87-11326
ATROPINE
Atropine - No effect on exercise muscle hyperemia in conscious rats p 3 A87-11657
AUTONOMIC NERVOUS SYSTEM
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
AUTOTROPHS
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871
AVIATION PSYCHOLOGY
A projective test applied in psychological testing of military flight personnel - The aero TAT p 18 A87-10567
Mental workload, the validation in France of an American subjective technique - SWAT --- Subjective Workload Assessment Technique p 18 A87-10570

B

BACKGROUND RADIATION
Natural radiation background - Aspects of radionuclide migration and biological effects p 1 A87-10661

BACTERIA
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
Biotesting of the atmosphere of a closed ecosystem by means of microorganisms p 20 A87-12875
BACTERICIDES
The effect of illumination on the antibacterial activity of microalgae p 5 A87-12864
BACTERIOLOGY
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
Bacteria of the Pseudomonas genus isolated from the ice sheet of an Antarctic glacier p 6 A87-12888
BALANCE
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
BED REST
Validation and application of single breath cardiac output determinations in man p 11 A87-11136
Metabolic changes during prolonged antiorthostatic hypokinesia --- weightlessness simulation p 15 N87-10698
BEHAVIOR
Ultradiant rhythms in physiology and behavior --- Book p 1 A87-10298
BIBLIOGRAPHIES
Aerospace medicine and biology: A continuing bibliography with indexes [NASA-SP-7011(289)] p 12 N87-10674
BIOCHEMICAL OXYGEN DEMAND
Upper and lower body anaerobic power comparison between biathletes and control subjects [AD-A167636] p 16 N87-10710
BIOCHEMISTRY
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
BIOCONTROL SYSTEMS
Learned control of heart rate during dynamic exercise in nonhuman primates p 3 A87-11656
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922
BIODYNAMICS
An approximation method for studying the productivity dynamics of a biological life support system when changing the operating mode p 21 A87-12878
BIOENGINEERING
The use of the dominant-index principle to develop complex bioengineering life-support systems p 20 A87-12872
BIOFEEDBACK
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
BIOLOGICAL EFFECTS
Natural radiation background - Aspects of radionuclide migration and biological effects p 1 A87-10661
The microwave problem --- possible biological hazards of radiation exposure p 19 A87-11209
The viability and the mutability of plants after space flight p 4 A87-12852
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
Effect of space flight factors on Chlorella p 4 A87-12858
The effect of illumination on the antibacterial activity of microalgae p 5 A87-12864
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of Closteriopsis acicularis var. africana Hind. p 6 A87-12867
Aerospace medicine and biology: A continuing bibliography with indexes [NASA-SP-7011(289)] p 12 N87-10674
BIOLOGICAL EVOLUTION
RNA and hot-water springs --- hypothetical environments for origin of life p 22 A87-10197
Physical causes of the asymmetry of living systems --- Russian book p 2 A87-11326
BIOLOGICAL MODELS (MATHEMATICS)
A conceptual model for predicting pilot group G tolerance for tactical fighter aircraft p 19 A87-11133
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709
BIOMASS ENERGY PRODUCTION
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877
BIOPHYSICS
Physical causes of the asymmetry of living systems --- Russian book p 2 A87-11326
BIOSYNTHESIS
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871
BLOOD FLOW
Validation and application of single breath cardiac output determinations in man p 11 A87-11136
BLOOD PRESSURE
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans --- Plasma Renin Activity and Plasma VasoPressin p 11 A87-11660
BLOOD VESSELS
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
BODY FLUIDS
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia --- weightlessness simulation p 16 N87-10701
BODY TEMPERATURE
Adaptation and biorhythms p 7 A87-12925
BODY VOLUME (BIOLOGY)
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
BONE DEMINERALIZATION
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
BONES
Bones and weightlessness p 13 N87-10681
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
BRAIN
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress p 3 A87-12800
BREATHING APPARATUS
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573

C

CABIN ATMOSPHERES
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573
CALCIUM METABOLISM
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
Metabolic changes during prolonged antiorthostatic hypokinesia --- weightlessness simulation p 15 N87-10698
CANCER
Malignant melanomas and flight fitness p 9 A87-10566
CARBOHYDRATE METABOLISM
General-biological character of the adaptive capacities of the metabolism of mammals in response to different extreme environmental factors p 1 A87-10440
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
The effect of the nitrogen source in the growth medium on the carbohydrate composition of Chlorella grown under intense continuous cultivation p 5 A87-12865
CARBON DIOXIDE REMOVAL
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
CARCINOGENS
Malignant melanomas and flight fitness p 9 A87-10566
CARDIOGRAPHY
Cardiovascular measurements in microgravity p 12 N87-10676
CARDIOLOGY
Learned control of heart rate during dynamic exercise in nonhuman primates p 3 A87-11656
CARDIOVASCULAR SYSTEM
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
Cardiovascular measurements in microgravity p 12 N87-10676
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia --- weightlessness simulation p 16 N87-10701
CAROTENE
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641
CATECHOLAMINE
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
CAVES
Functions of the human organism during prolonged stay and work in extreme conditions of caves p 12 A87-12924
CELLS (BIOLOGY)
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
Effects of long-term radiofrequency radiation on immunological competence and metabolism [AD-A169064] p 9 N87-11479
CENTRAL NERVOUS SYSTEM
Fatigue of intermittent submaximal voluntary contractions Central and peripheral factors p 11 A87-11651
CENTRAL NERVOUS SYSTEM STIMULANTS
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
CENTRIFUGING STRESS
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
CEREBRAL CORTEX
Corticofugal effects on the reticular formation and heart rhythm p 7 A87-12920
CHELATION
Anaerobic microbial transformations in subsurface environments: Highlights [DE86-008703] p 9 N87-11480
CHEMOTHERAPY
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
CHLORELLA
Effect of space flight factors on Chlorella p 4 A87-12858
Submicroscopic organization of Chlorella cells growing for nine days aboard Salyut-6 p 5 A87-12863
The effect of the nitrogen source in the growth medium on the carbohydrate composition of Chlorella grown under intense continuous cultivation p 5 A87-12865
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877
CIRCADIAN RHYTHMS
Adaptation and biorhythms p 7 A87-12925
CIRCULAR POLARIZATION
Effects of long-term radiofrequency radiation on immunological competence and metabolism [AD-A169064] p 9 N87-11479
CITIES
Life expectancy in tropical climates and urbanization p 21 N87-10648
Human comfort in the urban tropics p 21 N87-10649
CLOSED ECOLOGICAL SYSTEMS
Microorganisms in artificial ecosystems p 20 A87-12851
The gas exchange characteristics of an intensive culture of Closteriopsis acicularis var. africana Hind. p 6 A87-12870
Biotesting of the atmosphere of a closed ecosystem by means of microorganisms p 20 A87-12875
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support p 21 A87-12879

CLOUDS
Radiation doses from flying through nuclear debris clouds
[AD-A167959] p 17 N87-10711
COLD ACCLIMATIZATION
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress
p 3 A87-12800
COLOR VISION
An experimental design for colour sensitivity in target acquisition
[BAE-BT-12489-VOL-1] p 22 N87-11490
An experimental design for colour sensitivity in target acquisition, volume 2
[BAE-BT-12489-VOL-2] p 22 N87-11491
COMFORT
Human comfort in the urban tropics
p 21 N87-10649
COMPLEX SYSTEMS
The use of the dominant-index principle to develop complex bioengineering life-support systems
p 20 A87-12872
COMPUTER AIDED DESIGN
Human factors of intelligent computer aided display design p 19 A87-12216
COMPUTER PROGRAMS
Development of an expert systems computer program for control panel design enhancement
[DE86-012153] p 22 N87-11489
COMPUTERIZED SIMULATION
Radiation doses from flying through nuclear debris clouds
[AD-A167959] p 17 N87-10711
CONDITIONING (LEARNING)
Learned control of heart rate during dynamic exercise in nonhuman primates p 3 A87-11656
CONFERENCES
Proceedings of 2nd International Conference on Space Physiology
[ESA-SP-237] p 12 N87-10675
CONTAMINANTS
Biotesting of the atmosphere of a closed ecosystem by means of microorganisms p 20 A87-12875
CONTRACTION
Fatigue of intermittent submaximal voluntary contractions Central and peripheral factors
p 11 A87-11651
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
CONTRAST
A system for controlled presentation of the Arden contrast sensitivity test
[AD-A167969] p 17 N87-10712
CONTROL BOARDS
Development of an expert systems computer program for control panel design enhancement
[DE86-012153] p 22 N87-11489
CONVULSIONS
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
CORONARY CIRCULATION
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564
CORTISONE
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680
COSMONAUTS
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
COSMOS SATELLITES
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
Cosmos 1514 flight: Study of rhesus monkey ECG
p 8 N87-10707
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
CREW STATIONS
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
CULTURE TECHNIQUES
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions
p 5 A87-12862
The effect of the nitrogen source in the growth medium on the carbohydrate composition of Chlorella grown under intense continuous cultivation p 5 A87-12865
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of Closteriopsis acicularis var. africana Hind.
p 6 A87-12867
Growth and development of algae under cumulative cultivation after exposure to weightlessness
p 6 A87-12868
Mineral nutrition of dense populations of Euglena
p 6 A87-12869
The gas exchange characteristics of an intensive culture of Closteriopsis acicularis var. africana Hind.
p 6 A87-12870
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support
p 21 A87-12879
CYTOLOGY
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
Structural-functional characteristics of funaria hygrometrica moss protonema cells under prolonged rotation on a clinostat p 4 A87-12855
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860
Compounds of steroid nature in unicellular algae
p 5 A87-12861
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions
p 5 A87-12862
Submicroscopic organization of Chlorella cells growing for nine days aboard Salyut-6 p 5 A87-12863

D

DECISION MAKING
On actions due to lack of information --- human performance
[REPT-85-45] p 18 N87-11486
DEGRADATION
Anaerobic microbial transformations in subsurface environments: Highlights
[DE86-008703] p 9 N87-11480
DEOXYRIBONUCLEIC ACID
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
DESIGN ANALYSIS
A prototype space flight intravenous injection system
[NASA-CR-171911] p 17 N87-11481
DIGESTING
Anaerobic microbial transformations in subsurface environments: Highlights
[DE86-008703] p 9 N87-11480
DISPLAY DEVICES
Human factors of intelligent computer aided display design p 19 A87-12216
An experimental design for colour sensitivity in target acquisition
[BAE-BT-12489-VOL-1] p 22 N87-11490
An experimental design for colour sensitivity in target acquisition, volume 2
[BAE-BT-12489-VOL-2] p 22 N87-11491
DIURETICS
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
DIVING (UNDERWATER)
Respiratory mechanics in men following a deep air dive p 11 A87-11659
DOSAGE
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680

E

ECHOCARDIOGRAPHY
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
ECOSYSTEMS
Microorganisms in artificial ecosystems
p 20 A87-12851
EDUCATION
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
ELECTRIC FIELDS
Comparison of the coupling of grounded and ungrounded humans to vertical 60-Hz electric fields
[DE86-011140] p 17 N87-10713
ELECTRICAL GROUNDING
Comparison of the coupling of grounded and ungrounded humans to vertical 60-Hz electric fields
[DE86-011140] p 17 N87-10713
ELECTRICAL RESISTIVITY
Comparison of the coupling of grounded and ungrounded humans to vertical 60-Hz electric fields
[DE86-011140] p 17 N87-10713
ELECTROCARDIOGRAPHY
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
Electrical instability of the heart in animals with different resistance to immobilization stress p 3 A87-12799
Cosmos 1514 flight: Study of rhesus monkey ECG
p 8 N87-10707
ELECTROLYSIS
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
ELECTROLYTE METABOLISM
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia --- weightlessness simulation
p 16 N87-10701
ELECTROMAGNETIC ABSORPTION
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641
ELECTROMYOGRAPHY
Controlling the temporal structure of limb movements: A response
[AD-A169261] p 21 N87-11488
ENERGY CONSUMPTION
Upper and lower body anaerobic power comparison between biathletes and control subjects
[AD-A167636] p 16 N87-10710
ENERGY TRANSFER
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641
ENVIRONMENT SIMULATION
Respiratory mechanics in men following a deep air dive p 11 A87-11659
ENVIRONMENTS
Adaptation of humans and animals to extreme environmental conditions p 7 A87-12918
EQUIPMENT SPECIFICATIONS
A prototype space flight intravenous injection system
[NASA-CR-171911] p 17 N87-11481
ESCHERICHIA
A laboratory experiment with relevance to the survival of micro-organisms entering a planetary atmosphere
p 22 A87-12200
EXERCISE PHYSIOLOGY
Control of ventilation in extreme-altitude climbers
p 11 A87-11654
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655
Learned control of heart rate during dynamic exercise in nonhuman primates p 3 A87-11656
Atropine - No effect on exercise muscle hyperemia in conscious rats p 3 A87-11657
Electrical and mechanical activity of respiratory muscles during hypercapnia p 3 A87-11658
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise
p 14 N87-10685
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber
p 16 N87-10702
Upper and lower body anaerobic power comparison between biathletes and control subjects
[AD-A167636] p 16 N87-10710
EXOBIOLOGY
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
Aerospace medicine and biology: A continuing bibliography with indexes
[NASA-SP-7011(289)] p 12 N87-10674
EXPERT SYSTEMS
Development of an expert systems computer program for control panel design enhancement
[DE86-012153] p 22 N87-11489
EXTRAVEHICULAR ACTIVITY
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697

EYE MOVEMENTS
Research in the area of visual search
[AD-A168923] p 18 N87-11483

F

FALLOUT
Radiation doses from flying through nuclear debris clouds
[AD-A167959] p 17 N87-10711
FEMALES
Women's G tolerance p 10 A87-11134
FERMENTATION
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871
FIGHTER AIRCRAFT
A conceptual model for predicting pilot group G tolerance for tactical fighter aircraft p 19 A87-11133
FLIGHT CLOTHING
Anthropometric considerations for a four-axis side-arm flight controller
[AD-A168135] p 21 N87-11487
FLIGHT CONTROL
Anthropometric considerations for a four-axis side-arm flight controller
[AD-A168135] p 21 N87-11487
FLIGHT CREWS
Sickle cell disease and flight personnel p 9 A87-10565
Malignant melanomas and flight fitness p 9 A87-10566
A projective test applied in psychological testing of military flight personnel - The aero TAT p 18 A87-10567
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
Women's G tolerance p 10 A87-11134
Radiation doses from flying through nuclear debris clouds
[AD-A167959] p 17 N87-10711
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
Anthropometric considerations for a four-axis side-arm flight controller
[AD-A168135] p 21 N87-11487
FLIGHT HAZARDS
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
FLIGHT SAFETY
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573
FLIGHT SIMULATORS
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
FLUORESCENCE
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
FLY BY WIRE CONTROL
Anthropometric considerations for a four-axis side-arm flight controller
[AD-A168135] p 21 N87-11487
FRENCH SPACE PROGRAMS
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
FUNGI
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876

G

GAMMA RAYS
Radiation doses from flying through nuclear debris clouds
[AD-A167959] p 17 N87-10711
GAS EXCHANGE
The gas exchange characteristics of an intensive culture of Closteriopsis acicularis var. africana Hind. p 6 A87-12870
GAS TRANSPORT
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
GENETICS
The long and the short of long-term memory - A molecular framework p 2 A87-11626
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868
GERONTOLOGY
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
GLACIERS
Bacteria of the Pseudomonas genus isolated from the ice sheet of an Antarctic glacier p 6 A87-12888
GLYCOGENS
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
GRAVITATIONAL EFFECTS
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
GRAVITATIONAL PHYSIOLOGY
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
A conceptual model for predicting pilot group G tolerance for tactical fighter aircraft p 19 A87-11133
Women's G tolerance p 10 A87-11134
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans --- Plasma Renin Activity and Plasma VasoPressin p 11 A87-11660
The viability and the mutability of plants after space flight p 4 A87-12852
Structural-functional characteristics of funaria hygrometrica moss protonema cells under prolonged rotation on a clinostat p 4 A87-12855
Ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity p 4 A87-12856
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868
Proceedings of 2nd International Conference on Space Physiology
[ESA-SP-237] p 12 N87-10675
Cardiovascular measurements in microgravity p 12 N87-10676
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679
Bones and weightlessness p 13 N87-10681
The muscular system in weightlessness p 13 N87-10682
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697
Metabolic changes during prolonged antiorthostatic hypokinesia --- weightlessness simulation p 15 N87-10698
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia --- weightlessness simulation p 16 N87-10701
Animal studies on Spacelab-3 p 8 N87-10704
Animal models in space physiology p 8 N87-10705
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709
GROUND WATER
Anaerobic microbial transformations in subsurface environments: Highlights
[DE86-008703] p 9 N87-11480

H

HARDWARE
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
HEART FUNCTION
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
Validation and application of single breath cardiac output determinations in man p 11 A87-11136
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
Electrical instability of the heart in animals with different resistance to immobilization stress p 3 A87-12799
Corticofugal effects on the reticular formation and heart rhythm p 7 A87-12920
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922
HEART RATE
Learned control of heart rate during dynamic exercise in nonhuman primates p 3 A87-11656
Prediction of the metabolic cost of exercise from measurements during recovery
[AD-A168076] p 17 N87-11482
HELICOPTER CONTROL
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139
HELICOPTERS
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
HELMETS
Brain buckets --- development of helmets for aircraft pilots p 19 A87-10172
HEMATOPOIETIC SYSTEM
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479
HEMODYNAMIC RESPONSES
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
Atropine - No effect on exercise muscle hyperemia in conscious rats p 3 A87-11657
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans --- Plasma Renin Activity and Plasma VasoPressin p 11 A87-11660
HEMOGLOBIN
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
HIGH ALTITUDE BREATHING
Control of ventilation in extreme-altitude climbers p 11 A87-11654
HIGH ALTITUDE ENVIRONMENTS
Morphofunctional indices of animals' individual resistance to hypoxia p 7 A87-12921
HIGH ALTITUDE TESTS
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber p 16 N87-10702
HISTOCHEMICAL ANALYSIS
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
HISTOLOGY
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479
HORMONE METABOLISMS
Ultradiant rhythms in physiology and behavior --- Book p 1 A87-10298
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans --- Plasma Renin Activity and Plasma VasoPressin p 11 A87-11660
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696

Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness
p 15 N87-10699
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703

HOT WEATHER
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate
p 12 A87-12922

HUMAN BEINGS
Comparison of the coupling of grounded and ungrounded humans to vertical 60-Hz electric fields
[DE86-011140] p 17 N87-10713

HUMAN BODY
Mechanical solid vibrations. II - Low and high frequency vibrations p 10 A87-10571
Adaptation of humans and animals to extreme environmental conditions p 7 A87-12918
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate
p 12 A87-12922
The thermoregulatory characteristics of inhabitants of different climatic-geographical regions during adaptation to moderate climate p 12 A87-12923
Functions of the human organism during prolonged stay and work in extreme conditions of caves
p 12 A87-12924
Upper and lower body anaerobic power comparison between biathletes and control subjects
[AD-A167636] p 16 N87-10710

HUMAN CENTRIFUGES
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678

HUMAN FACTORS ENGINEERING
Brain buckets --- development of helmets for aircraft pilots p 19 A87-10172
Human factors of intelligent computer aided display design p 19 A87-12216
Life expectancy in tropical climates and urbanization
p 21 N87-10648
Human comfort in the urban tropics
p 21 N87-10649
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
An experimental design for colour sensitivity in target acquisition
[BAE-BT-12489-VOL-1] p 22 N87-11490
An experimental design for colour sensitivity in target acquisition, volume 2
[BAE-BT-12489-VOL-2] p 22 N87-11491

HUMAN PERFORMANCE
THe effects of terrain clutter on observer behaviour during search of complex scenery
[BAE-BT-13535] p 18 N87-11484
On actions due to lack of information --- human performance
[REPT-85-45] p 18 N87-11486

HUMAN TOLERANCES
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850

HYPERCAPNIA
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
Electrical and mechanical activity of respiratory muscles during hypercapnia p 3 A87-11658

HYPEROXIA
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655

HYPOBARIC ATMOSPHERES
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber
p 16 N87-10702

HYPOKINESIA
Electrical instability of the heart in animals with different resistance to immobilization stress p 3 A87-12799
Metabolic changes during prolonged antiorthostatic hypokinesia --- weightlessness simulation
p 15 N87-10698
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia --- weightlessness simulation
p 16 N87-10701

HYPOXIA
Sickle cell disease and flight personnel
p 9 A87-10565
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
The physiological mechanisms of adaptation to hypoxia p 7 A87-12919
Morphofunctional indices of animals' individual resistance to hypoxia p 7 A87-12921
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber
p 16 N87-10702

I

ILLUMINANCE
The effect of illumination on the antibacterial activity of microalgae p 5 A87-12864

IMMOBILIZATION
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689

IMMUNOASSAY
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703

IMMUNOLOGY
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479

INFORMATION THEORY
On actions due to lack of information --- human performance
[REPT-85-45] p 18 N87-11486

INFRARED PHOTOGRAPHY
Infrared measurement of eye movement. Presentation of the Eye Movement in Infrared and Angular Torsion (EMIRAT) experiment --- Spacelab payload
p 15 N87-10695

INFRARED RADIATION
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850

INTRAVENOUS PROCEDURES
A prototype space flight intravenous injection system
[NASA-CR-171911] p 17 N87-11481

ISCHEMIA
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber
p 16 N87-10702

L

LIFE SCIENCES
USSR Space Life Sciences Digest, issue 8
[NASA-CR-3922(09)] p 8 N87-11478

LIFE SPAN
Life expectancy in tropical climates and urbanization
p 21 N87-10648

LIFE SUPPORT SYSTEMS
The use of the dominant-index principle to develop complex bioengineering life-support systems
p 20 A87-12872
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877
An approximation method for studying the productivity dynamics of a biological life support system when changing the operating mode p 21 A87-12878

LIMBS (ANATOMY)
Controlling the temporal structure of limb movements: A response
[AD-A169261] p 21 N87-11488

LINEAR ENERGY TRANSFER (LET)
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664

LIPID METABOLISM
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655

LONG DURATION SPACE FLIGHT
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854

LONG TERM EFFECTS
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860

LOW TEMPERATURE TESTS
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress
p 3 A87-12800

LYMPHOCYTES
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697

M

MALES
Prediction of the metabolic cost of exercise from measurements during recovery
[AD-A168076] p 17 N87-11482

MAN ENVIRONMENT INTERACTIONS
General-biological character of the adaptive capacities of the metabolism of mammals in response to different extreme environmental factors p 1 A87-10440
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support
p 21 A87-12879

MAN MACHINE SYSTEMS
A conceptual model for predicting pilot group G tolerance for tactical fighter aircraft p 19 A87-11133

MANNED SPACE FLIGHT
Space motion sickness p 15 N87-10693
A prototype space flight intravenous injection system
[NASA-CR-171911] p 17 N87-11481

MANUAL CONTROL
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes
p 19 A87-11139

MAPPING
Research in the area of visual search
[AD-A168923] p 18 N87-11483

MASS
Controlling the temporal structure of limb movements: A response
[AD-A169261] p 21 N87-11488

MEMORY
The long and the short of long-term memory - A molecular framework p 2 A87-11626

METABOLISM
Upper and lower body anaerobic power comparison between biathletes and control subjects
[AD-A167636] p 16 N87-10710
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479
Prediction of the metabolic cost of exercise from measurements during recovery
[AD-A168076] p 17 N87-11482

METALS
Anaerobic microbial transformations in subsurface environments: Highlights
[DE86-008703] p 9 N87-11480

MICROCOMPUTERS
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450

MICROORGANISMS
A laboratory experiment with relevance to the survival of micro-organisms entering a planetary atmosphere
p 22 A87-12200
Microorganisms in artificial ecosystems
p 20 A87-12851
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support
p 21 A87-12879
Anaerobic microbial transformations in subsurface environments: Highlights
[DE86-008703] p 9 N87-11480

MICROWAVE EQUIPMENT
The microwave problem --- possible biological hazards of radiation exposure p 19 A87-11209

MICROWAVES
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663

MINERAL METABOLISM
Mineral nutrition of dense populations of Euglena
p 6 A87-12869
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877

MODELS
Controlling the temporal structure of limb movements: A response
[AD-A169261] p 21 N87-11488

MOLECULAR BIOLOGY
The long and the short of long-term memory - A molecular framework p 2 A87-11626
MONKEYS
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Animal studies on Spacelab-3 p 8 N87-10704
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707
MORPHOLOGY
Morphofunctional indices of animals' individual resistance to hypoxia p 7 A87-12921
MOTION SICKNESS
Space motion sickness p 15 N87-10693
MUSCLES
The muscular system in weightlessness p 13 N87-10682
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683
MUSCULAR FATIGUE
Fatigue of intermittent submaximal voluntary contractions Central and peripheral factors p 11 A87-11651
MUSCULAR FUNCTION
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
Atropine - No effect on exercise muscle hyperemia in conscious rats p 3 A87-11657
Electrical and mechanical activity of respiratory muscles during hypercapnia p 3 A87-11658
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
MUSCULAR TONUS
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
MUSCULOSKELETAL SYSTEM
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
MUTATIONS
The viability and the mutability of plants after space flight p 4 A87-12852
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
MYOCARDIUM
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564

N

NEUROMUSCULAR TRANSMISSION
Electrical and mechanical activity of respiratory muscles during hypercapnia p 3 A87-11658
NEUROPHYSIOLOGY
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
NITROGEN
The effect of the nitrogen source in the growth medium on the carbohydrate composition of Chlorella grown under intense continuous cultivation p 5 A87-12865
NUCLEAR EXPLOSION EFFECT
Radiation doses from flying through nuclear debris clouds [AD-A167959] p 17 N87-10711
NUTRIENTS
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of Closteriopsis acicularis var. africana Hind. p 6 A87-12867
NUTRITION
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876
NUTRITIONAL REQUIREMENTS
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
Mineral nutrition of dense populations of Euglena p 6 A87-12869

O

ORGANIC COMPOUNDS
Compounds of steroid nature in unicellular algae p 5 A87-12861
ORGANISMS
Physical causes of the asymmetry of living systems --- Russian book p 2 A87-11326
ORTHOSTATIC TOLERANCE
Metabolic changes during prolonged antiorthostatic hypokinesia --- weightlessness simulation p 15 N87-10698
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia --- weightlessness simulation p 16 N87-10701
OSTEOPOROSIS
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
OXIMETRY
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
OXYGEN CONSUMPTION
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
Prediction of the metabolic cost of exercise from measurements during recovery [AD-A168076] p 17 N87-11482
OXYGEN PRODUCTION
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
OXYGEN TENSION
Validation and application of single breath cardiac output determinations in man p 11 A87-11136

P

PANELS
Development of an expert systems computer program for control panel design enhancement [DE86-012153] p 22 N87-11489
PASSENGER AIRCRAFT
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573
PATHOLOGY
Effects of long-term radiofrequency radiation on immunological competence and metabolism [AD-A169064] p 9 N87-11479
PATIENTS
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber p 16 N87-10702
PELVIS
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
PEPTIDES
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress p 3 A87-12800
PERIPHERAL NERVOUS SYSTEM
Fatigue of intermittent submaximal voluntary contractions Central and peripheral factors p 11 A87-11651
PERSONNEL
Human factors research in aircrew performance and training [AD-A167950] p 21 N87-10714
PERSONNEL SELECTION
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
Vestibular tests in cosmonaut selection and training p 15 N87-10694
PHARMACOLOGY
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
PHOSPHORUS METABOLISM
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
PHOTOMETRY
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
PHOTOSYNTHESIS
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871
PHOTOTROPISM
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support p 21 A87-12879
PHYSICAL EXERCISE
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
Validation and application of single breath cardiac output determinations in man p 11 A87-11136
Prediction of the metabolic cost of exercise from measurements during recovery [AD-A168076] p 17 N87-11482
PHYSICAL FITNESS
Upper and lower body anaerobic power comparison between biathletes and control subjects [AD-A167636] p 16 N87-10710
PHYSICAL WORK
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
PHYSIOLOGICAL EFFECTS
Mechanical solid vibrations. II - Low and high frequency vibrations p 10 A87-10571
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
Proceedings of 2nd International Conference on Space Physiology [ESA-SP-237] p 12 N87-10675
Cardiovascular measurements in microgravity p 12 N87-10676
Bones and weightlessness p 13 N87-10681
The muscular system in weightlessness p 13 N87-10682
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
Prediction of the metabolic cost of exercise from measurements during recovery [AD-A168076] p 17 N87-11482
PHYSIOLOGICAL FACTORS
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
PHYSIOLOGICAL RESPONSES
Ultradiant rhythms in physiology and behavior --- Book p 1 A87-10298
General-biological character of the adaptive capacities of the metabolism of mammals in response to different extreme environmental factors p 1 A87-10440
Women's G tolerance p 10 A87-11134
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
Adaptation of humans and animals to extreme environmental conditions p 7 A87-12918
The physiological mechanisms of adaptation to hypoxia p 7 A87-12919
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679
Controlling the temporal structure of limb movements: A response [AD-A169261] p 21 N87-11488
PHYSIOLOGICAL TESTS
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
PILOT PERFORMANCE
Mechanical solid vibrations. II - Low and high frequency vibrations p 10 A87-10571
A conceptual model for predicting pilot group G tolerance for tactical fighter aircraft p 19 A87-11133

Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
Air-to-ground target acquisition in the presence of sensor vibration
[BAE-BT-14222] p 18 N87-11485
PILOT SELECTION
Sickle cell disease and flight personnel p 9 A87-10565
Malignant melanomas and flight fitness p 9 A87-10566
PILOT TRAINING
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
PILOTS (PERSONNEL)
Anthropometric considerations for a four-axis side-arm flight controller
[AD-A168135] p 21 N87-11487
PLANETARY ATMOSPHERES
A laboratory experiment with relevance to the survival of micro-organisms entering a planetary atmosphere p 22 A87-12200
PLANT STRESS
The viability and the mutability of plants after space flight p 4 A87-12852
Structural-functional characteristics of funaria hygrometrica moss protonema cells under prolonged rotation on a clinostat p 4 A87-12855
Ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity p 4 A87-12856
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
Effect of space flight factors on Chlorella p 4 A87-12858
Submicroscopic organization of Chlorella cells growing for nine days aboard Salyut-6 p 5 A87-12863
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
POLYSACCHARIDES
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
POSTURE
Metabolic changes during prolonged antiorthostatic hypokinesia --- weightlessness simulation p 15 N87-10698
PRESSURE REDUCTION
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697
PREVENTION
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
PRODUCTIVITY
An approximation method for studying the productivity dynamics of a biological life support system when changing the operating mode p 21 A87-12878
PROTEIN METABOLISM
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
PROTEIN SYNTHESIS
The long and the short of long-term memory - A molecular framework p 2 A87-11626
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
PROTEINS
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683
PROTOTYPES
A prototype space flight intravenous injection system [NASA-CR-171911] p 17 N87-11481
PROVING
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714
PSEUDOMONAS
Bacteria of the Pseudomonas genus isolated from the ice sheet of an Antarctic glacier p 6 A87-12888
PSYCHOLOGICAL EFFECTS
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
PSYCHOLOGICAL TESTS
A projective test applied in psychological testing of military flight personnel - The aero TAT p 18 A87-10567
Mental workload, the validation in France of an American subjective technique - SWAT --- Subjective Workload Assessment Technique p 18 A87-10570
PSYCHOPHARMACOLOGY
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
PULMONARY CIRCULATION
Validation and application of single breath cardiac output determinations in man p 11 A87-11136
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
PULMONARY FUNCTIONS
Respiratory mechanics in men following a deep air dive p 11 A87-11659
PUPILLOMETRY
Infrared measurement of eye movement. Presentation of the Eye Movement in Infrared and Angular Torsion (EMIRAT) experiment --- Spacelab payload p 15 N87-10695

R

RADIATION DOSAGE
The microwave problem --- possible biological hazards of radiation exposure p 19 A87-11209
Radiation doses from flying through nuclear debris clouds
[AD-A167959] p 17 N87-10711
RADIATION EFFECTS
General-biological character of the adaptive capacities of the metabolism of mammals in response to different extreme environmental factors p 1 A87-10440
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479
RADIATION HAZARDS
The microwave problem --- possible biological hazards of radiation exposure p 19 A87-11209
Radiation doses from flying through nuclear debris clouds
[AD-A167959] p 17 N87-10711
RADIATION PROTECTION
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
The microwave problem --- possible biological hazards of radiation exposure p 19 A87-11209
RADIATION TOLERANCE
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
RADIOACTIVE ISOTOPES
Natural radiation background - Aspects of radionuclide migration and biological effects p 1 A87-10661
RADIOACTIVE MATERIALS
Anaerobic microbial transformations in subsurface environments: Highlights
[DE86-008703] p 9 N87-11480
RADIOBIOLOGY
Natural radiation background - Aspects of radionuclide migration and biological effects p 1 A87-10661
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
RADIOIMMUNOASSAY
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680
RAPID EYE MOVEMENT STATE
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
RATS
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
Animal studies on Spacelab-3 p 8 N87-10704
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479
REDUCED GRAVITY
Cardiovascular measurements in microgravity p 12 N87-10676
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
REMOTE SENSORS
Air-to-ground target acquisition in the presence of sensor vibration
[BAE-BT-14222] p 18 N87-11485
RESEARCH AND DEVELOPMENT
The use of the dominant-index principle to develop complex bioengineering life-support systems p 20 A87-12872
RESEARCH MANAGEMENT
Research in the area of visual search
[AD-A168923] p 18 N87-11483
RESPIRATORY PHYSIOLOGY
Control of ventilation in extreme-altitude climbers p 11 A87-11654
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655
Electrical and mechanical activity of respiratory muscles during hypercapnia p 3 A87-11658
Respiratory mechanics in men following a deep air dive p 11 A87-11659
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922
RETENTION (PSYCHOLOGY)
The long and the short of long-term memory - A molecular framework p 2 A87-11626
RETICLES
Corticofugal effects on the reticular formation and heart rhythm p 7 A87-12920
RHYTHM (BIOLOGY)
Ultradiant rhythms in physiology and behavior --- Book p 1 A87-10298
Corticofugal effects on the reticular formation and heart rhythm p 7 A87-12920
Adaptation and biorhythms p 7 A87-12925
RIBONUCLEIC ACIDS
RNA and hot-water springs --- hypothetical environments for origin of life p 22 A87-10197
ROOTS
Ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity p 4 A87-12856

S

SACCADIC EYE MOVEMENTS
Infrared measurement of eye movement. Presentation of the Eye Movement in Infrared and Angular Torsion (EMIRAT) experiment --- Spacelab payload p 15 N87-10695
SCENE ANALYSIS
THe effects of terrain clutter on observer behaviour during search of complex scenery
[BAE-BT-13535] p 18 N87-11484
SEA LEVEL
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
SEARCHING
Research in the area of visual search
[AD-A168923] p 18 N87-11483
SEAWEEDS
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860
SEEDS
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
SENSITIVITY
A system for controlled presentation of the Arden contrast sensitivity test
[AD-A167969] p 17 N87-10712

SENSORIMOTOR PERFORMANCE
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
SENSORY DEPRIVATION
Functions of the human organism during prolonged stay and work in extreme conditions of caves p 12 A87-12924
SKIN (ANATOMY)
Malignant melanomas and flight fitness p 9 A87-10566
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850
SLEEP
Ultradiant rhythms in physiology and behavior --- Book p 1 A87-10298
SLEEP DEPRIVATION
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
SOFTWARE ENGINEERING
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
SOURCES
The effect of the nitrogen source in the growth medium on the carbohydrate composition of Chlorella grown under intense continuous cultivation p 5 A87-12865
SPACE ENVIRONMENT SIMULATION
A laboratory experiment with relevance to the survival of micro-organisms entering a planetary atmosphere p 22 A87-12200
SPACE FLIGHT
Proceedings of 2nd International Conference on Space Physiology
[ESA-SP-237] p 12 N87-10675
Animal models in space physiology p 8 N87-10705
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709
SPACE FLIGHT STRESS
The viability and the mutability of plants after space flight p 4 A87-12852
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
Structural-functional characteristics of funaria hygrometrica moss protonema cells under prolonged rotation on a clinostat p 4 A87-12855
Ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity p 4 A87-12856
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
Effect of space flight factors on Chlorella p 4 A87-12858
Submicroscopic organization of Chlorella cells growing for nine days aboard Salyut-6 p 5 A87-12863
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
SPACE SHUTTLE MISSION 51-G
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
SPACE SUITS
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans --- Plasma Renin Activity and Plasma VasoPressin p 11 A87-11660
SPACEBORNE EXPERIMENTS
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
SPACECRAFT ENVIRONMENTS
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
SPACECREWS
Vestibular tests in cosmonaut selection and training p 15 N87-10694
SPACELAB PAYLOADS
Infrared measurement of eye movement. Presentation of the Eye Movement in Infrared and Angular Torsion (EMIRAT) experiment --- Spacelab payload p 15 N87-10695
Animal studies on Spacelab-3 p 8 N87-10704
SPORTS MEDICINE
Upper and lower body anaerobic power comparison between biathletes and control subjects
[AD-A167636] p 16 N87-10710
SPRINGS (ELASTIC)
Controlling the temporal structure of limb movements: A response
[AD-A169261] p 21 N87-11488
SPRINGS (WATER)
RNA and hot-water springs --- hypothetical environments for origin of life p 22 A87-10197
STEROIDS
Compounds of steroid nature in unicellular algae p 5 A87-12861
STRESS (PHYSIOLOGY)
Electrical instability of the heart in animals with different resistance to immobilization stress p 3 A87-12799
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress p 3 A87-12800
Adaptation of humans and animals to extreme environmental conditions p 7 A87-12918
Functions of the human organism during prolonged stay and work in extreme conditions of caves p 12 A87-12924
STRESS (PSYCHOLOGY)
Mental workload, the validation in France of an American subjective technique - SWAT --- Subjective Workload Assessment Technique p 18 A87-10570
SURVIVAL
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
SUSPENDING (MIXING)
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
SYNTHESIS (CHEMISTRY)
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
SYSTEM EFFECTIVENESS
An approximation method for studying the productivity dynamics of a biological life support system when changing the operating mode p 21 A87-12878
SYSTEMS ENGINEERING
Development of an expert systems computer program for control panel design enhancement
[DE86-012153] p 22 N87-11489

T

TARGET ACQUISITION
THe effects of terrain clutter on observer behaviour during search of complex scenery
[BAE-BT-13535] p 18 N87-11484
Air-to-ground target acquisition in the presence of sensor vibration
[BAE-BT-14222] p 18 N87-11485
An experimental design for colour sensitivity in target acquisition
[BAE-BT-12489-VOL-1] p 22 N87-11490
An experimental design for colour sensitivity in target acquisition, volume 2
[BAE-BT-12489-VOL-2] p 22 N87-11491
TEMPERATE REGIONS
The thermoregulatory characteristics of inhabitants of different climatic-geographical regions during adaptation to moderate climate p 12 A87-12923
TEMPERATURE EFFECTS
Human comfort in the urban tropics p 21 N87-10649
TERRAIN ANALYSIS
THe effects of terrain clutter on observer behaviour during search of complex scenery
[BAE-BT-13535] p 18 N87-11484
THALLIUM
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564
THERMAL RADIATION
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850
THERMOREGULATION
The thermoregulatory characteristics of inhabitants of different climatic-geographical regions during adaptation to moderate climate p 12 A87-12923
TIME
Controlling the temporal structure of limb movements: A response
[AD-A169261] p 21 N87-11488
TOCOPHEROL
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
TOLERANCES (PHYSIOLOGY)
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479
TOMOGRAPHY
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564
TOXIC HAZARDS
Biotesting of the atmosphere of a closed ecosystem by means of microorganisms p 20 A87-12875
TRAINING ANALYSIS
Vestibular tests in cosmonaut selection and training p 15 N87-10694
TREADMILLS
Prediction of the metabolic cost of exercise from measurements during recovery
[AD-A168076] p 17 N87-11482
TROPICAL REGIONS
Life expectancy in tropical climates and urbanization p 21 N87-10648
Human comfort in the urban tropics p 21 N87-10649

U

U.S.S.R.
USSR Space Life Sciences Digest, issue 8
[NASA-CR-3922(09)] p 8 N87-11478
ULTRAVIOLET LASERS
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
UNDERWATER PHYSIOLOGY
Respiratory mechanics in men following a deep air dive p 11 A87-11659
URBAN PLANNING
Human comfort in the urban tropics p 21 N87-10649
UREAS
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699

V

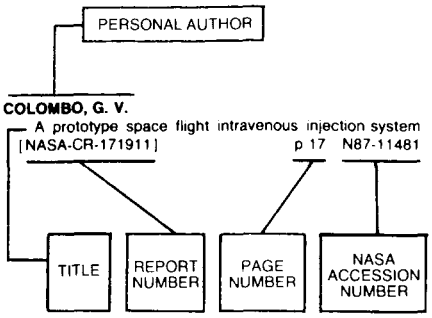
VEGETATION GROWTH
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
Ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity p 4 A87-12856
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of Closteriopsis acicularis var. africana Hind. p 6 A87-12867
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868
Mineral nutrition of dense populations of Euglena p 6 A87-12869
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support p 21 A87-12879
VENTILATION
Prediction of the metabolic cost of exercise from measurements during recovery
[AD-A168076] p 17 N87-11482
VERTICAL ORIENTATION
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
VERTIGO
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
VESTIBULAR TESTS
Vestibular tests in cosmonaut selection and training p 15 N87-10694
VIABILITY
The viability and the mutability of plants after space flight p 4 A87-12852
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860

VIBRATION EFFECTS
Mechanical solid vibrations. II - Low and high frequency vibrations p 10 A87-10571
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139
Air-to-ground target acquisition in the presence of sensor vibration
[BAE-BT-14222] p 18 N87-11485
VIBRATION PERCEPTION
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139
VISION
A system for controlled presentation of the Arden contrast sensitivity test
[AD-A167969] p 17 N87-10712
VISUAL ACUITY
A system for controlled presentation of the Arden contrast sensitivity test
[AD-A167969] p 17 N87-10712
VISUAL OBSERVATION
THe effects of terrain clutter on observer behaviour during search of complex scenery
[BAE-BT-13535] p 18 N87-11484
VISUAL PERCEPTION
A system for controlled presentation of the Arden contrast sensitivity test
[AD-A167969] p 17 N87-10712
Research in the area of visual search
[AD-A168923] p 18 N87-11483
An experimental design for colour sensitivity in target acquisition
[BAE-BT-12489-VOL-1] p 22 N87-11490
An experimental design for colour sensitivity in target acquisition, volume 2
[BAE-BT-12489-VOL-2] p 22 N87-11491
VISUAL SIGNALS
Research in the area of visual search
[AD-A168923] p 18 N87-11483
VISUAL TASKS
Air-to-ground target acquisition in the presence of sensor vibration
[BAE-BT-14222] p 18 N87-11485

W

WEIGHTLESSNESS
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868
Proceedings of 2nd International Conference on Space Physiology
[ESA-SP-237] p 12 N87-10675
Bones and weightlessness p 13 N87-10681
The muscular system in weightlessness p 13 N87-10682
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709
WEIGHTLESSNESS SIMULATION
Structural-functional characteristics of funaria hygrometrica moss protonema cells under prolonged rotation on a clinostat p 4 A87-12855
Ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity p 4 A87-12856
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697
Metabolic changes during prolonged antiorthostatic hypokinesia --- weightlessness simulation p 15 N87-10698
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia --- weightlessness simulation p 16 N87-10701
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
WORK CAPACITY
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
Upper and lower body anaerobic power comparison between biathletes and control subjects
[AD-A167636] p 16 N87-10710

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g., NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title. Under any one author's name the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

ABERTRAND, A.
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564
ABILOV, Z. K.
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
ABYZOV, S. S.
Bacteria of the Pseudomonas genus isolated from the ice sheet of an Antarctic glacier p 6 A87-12888
ADAMCHIK, ZH. G.
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
ADAMS, R. P.
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655
AGADZHANIAN, N. A.
Adaptation of humans and animals to extreme environmental conditions p 7 A87-12918
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922
Adaptation and biorhythms p 7 A87-12925
AGIN, B.
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
AKHUNDOVA, D. D.
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
AL-MUFTI, S.
A laboratory experiment with relevance to the survival of micro-organisms entering a planetary atmosphere p 22 A87-12200
ALEKPEROV, U. K.
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
ALEKSAKHIN, R. M.
Natural radiation background - Aspects of radionuclide migration and biological effects p 1 A87-10661
ALEKSANDROVA, S. S.
Morphofunctional indices of animals' individual resistance to hypoxia p 7 A87-12921
ALEXANDRE, C.
Bones and weightlessness p 13 N87-10681
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
ALIEV, A. A.
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
ALLEVARD, A. M.
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
ALPATOV, A. M.
Adaptation and biorhythms p 7 A87-12925
AMALBERTI, R.
Mental workload, the validation in France of an American subjective technique - SWAT p 18 A87-10570
AMOR, M.
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564
ANIKEEVA, I. D.
The viability and the mutability of plants after space flight p 4 A87-12852
Effect of space flight factors on Chlorella p 4 A87-12858
ANNAT, G.
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
ANTONIAN, A. A.
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877
ARBEILLE, P.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
ARLASHCHENKO, N. I.
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
ARMSTRONG, R. B.
Atropine - No effect on exercise muscle hyperemia in conscious rats p 3 A87-11657
ASKEROV, I. T.
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
ASTAFEV, S. V.
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450

B

BACHMANN, K.
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber p 16 N87-10702
BAIANOVA, IU. I.
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876
BAKULIN, A. V.
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
BALAUD, A.
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564
BARNES, P. R.
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans p 11 A87-11660
BARRETT, D.
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641
BASCANDS, J. L.
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
BASHKIROV, A. A.
The physiological mechanisms of adaptation to hypoxia p 7 A87-12919
BATAILLE, M.
Mental workload, the validation in France of an American subjective technique - SWAT p 18 A87-10570
BATEJAT, D.
Mental workload, the validation in France of an American subjective technique - SWAT p 18 A87-10570
BERRY, W.
Animal studies on Spacelab-3 p 8 N87-10704
BERSON, M.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
BERTHOZ, A.
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
BERTONCINI, J.
Respiratory mechanics in men following a deep air dive p 11 A87-11659
BES, A.
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
BIGLAND-RITCHIE, B.
Fatigue of intermittent submaximal voluntary contractions Central and peripheral factors p 11 A87-11651
BILL, J.
Sickle cell disease and flight personnel p 9 A87-10565
BIRKUI, P. J.
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680
BIZOLLON, C. A.
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
BLOSTIN, R.
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707

BONDARENKO, T. I.
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress p 3 A87-12800
BONDE-PETERSEN, F.
Cardiovascular measurements in microgravity p 12 N87-10676
BORREDON, P.
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
BORUZDINA, M. A.
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
BOUFFARD, M.
A projective test applied in psychological testing of military flight personnel - The aero TAT p 18 A87-10567
BOURGET, D.
Sickle cell disease and flight personnel p 9 A87-10565
BRADLEY, M. E.
Respiratory mechanics in men following a deep air dive p 11 A87-11659
BRION, R.
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
BRUNEL, P.
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
BUNIATIAN, A. M.
Electrical instability of the heart in animals with different resistance to immobilization stress p 3 A87-12799
BURLATON, J. P.
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
BURTON, R. R.
A conceptual model for predicting pilot group G tolerance for tactical fighter aircraft p 19 A87-11133
BUTYLKIN, V. V.
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922

C

CAILLER, B.
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707
CALLAHAN, P.
Animal studies on Spacelab-3 p 8 N87-10704
CAMUS, A. L.
Infrared measurement of eye movement. Presentation of the Eye Movement in Infrared and Angular Torsion (EMIRAT) experiment p 15 N87-10695
CANTIN, M.
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
CASCELLIO, J. C.
Sickle cell disease and flight personnel p 9 A87-10565
CASHMAN, P. A.
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655
CASTELLUCCI, V. F.
The long and the short of long-term memory - A molecular framework p 2 A87-11626
CATRON, P. W.
Respiratory mechanics in men following a deep air dive p 11 A87-11659
CHAPPARD, D.
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
CHAPUY, C.
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
CHATARD, J. C.
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
CHEREVATENKO, A. P.
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
CHERNIACK, N. S.
Electrical and mechanical activity of respiratory muscles during hypercapnia p 3 A87-11658
CHOU, C. K.
Effects of long-term radiofrequency radiation on immunological competence and metabolism [AD-A169064] p 9 N87-11479
CHRIST, K. A.
Anthropometric considerations for a four-axis side-arm flight controller [AD-A168135] p 21 N87-11487
CINTRON, N. M.
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679
CLAGETT, J. A.
Effects of long-term radiofrequency radiation on immunological competence and metabolism [AD-A169064] p 9 N87-11479
CLEMEDSON, C.-J.
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
CLEMENT, G.
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
CLERE, J. M.
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
COLOMBO, G. V.
A prototype space flight intravenous injection system [NASA-CR-171911] p 17 N87-11481
CRIBORN, C. O.
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
CROSS, K. D.
Human factors research in aircrew performance and training [AD-A167950] p 21 N87-10714
CYMERMAN, A.
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138

D

DANILOV, V. N.
The use of the dominant-index principle to develop complex bioengineering life-support systems p 20 A87-12872
DAVIS, J. R.
Space motion sickness p 15 N87-10693
DEAN, G. J.
Air-to-ground target acquisition in the presence of sensor vibration [BAE-BT-14222] p 18 N87-11485
DEBELLIS, W. B.
Anthropometric considerations for a four-axis side-arm flight controller [AD-A168135] p 21 N87-11487
DELMAS, P.
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
DEMIN, N. N.
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
DERII, B. N.
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
DESPLANCHES, D.
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
DEUBER, H. J.
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber p 16 N87-10702
DIDIER, A.
Sickle cell disease and flight personnel p 9 A87-10565
Malignant melanomas and flight fitness p 9 A87-10566
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
DOHERTY, T. J.
Prediction of the metabolic cost of exercise from measurements during recovery [AD-A168076] p 17 N87-11482
DRONIOU, J.
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
DRUGOVA, N. A.
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support p 21 A87-12879
DUGGAN, A.
Upper and lower body anaerobic power comparison between biathletes and control subjects [AD-A167636] p 16 N87-10710
DUNCAN, U.
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697
DZENIS, V. V.
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
DZIADOS, J.
Prediction of the metabolic cost of exercise from measurements during recovery [AD-A168076] p 17 N87-11482

E

ELFIMOV, A. I.
Morphofunctional indices of animals' individual resistance to hypoxia p 7 A87-12921
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922
ENGEL, B. T.
Learned control of heart rate during dynamic exercise in nonhuman primates p 3 A87-11656
ESHCHENKO, V. V.
Functions of the human organism during prolonged stay and work in extreme conditions of caves p 12 A87-12924

F

FADEEVA, S. N.
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
FECHT, B. A.
Development of an expert systems computer program for control panel design enhancement [DE86-012153] p 22 N87-11489
FLANDROIS, R.
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
FLETCHER, E. R.
Validation and application of single breath cardiac output determinations in man p 11 A87-11136
FLYNN, E. T., JR.
Respiratory mechanics in men following a deep air dive p 11 A87-11659
FOSTER, K. R.
The microwave problem p 19 A87-11209
FRANCIS, A. J.
Anaerobic microbial transformations in subsurface environments: Highlights [DE86-008703] p 9 N87-11480
FRANKLIN, A. L.
Development of an expert systems computer program for control panel design enhancement [DE86-012153] p 22 N87-11489
FROLOV, I. B.
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
FRUTOSO, J.
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
FULCO, C. S.
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
FUNK, G.
Animal studies on Spacelab-3 p 8 N87-10704
FURBUSH, F.
Fatigue of intermittent submaximal voluntary contractions Central and peripheral factors p 11 A87-11651

G

GALKINA, T. B.
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868

GALLE-TESSONNEAU, J. R.
A projective test applied in psychological testing of military flight personnel - The aero TAT p 18 A87-10567

GARSHNEK, V.
USSR Space Life Sciences Digest, issue 8 [NASA-CR-3922(09)] p 8 N87-11478

GAUQUELIN, G.
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703

GAUTHIER, G. M.
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139

GAVRISH, T. G.
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866

GEELEN, G.
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans p 11 A87-11660
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703

GEELIN, G.
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699

GHAEMMAGHAMI, F.
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699

GHARIB, C.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703

GILLINGHAM, K. K.
Women's G tolerance p 10 A87-11134

GILSTRAP, L. C.
Women's G tolerance p 10 A87-11134

GLINES, C. V.
Brain buckets p 19 A87-10172

GOBLET, C.
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683

GODIK, E. E.
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850

GOELET, P.
The long and the short of long-term memory - A molecular framework p 2 A87-11626

GOLUBKOVICH, A. V.
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873

GOURBAT, J. P.
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
Malignant melanomas and flight fitness p 9 A87-10566

GOVORUN, R. D.
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664

GRAEVSKAIA, B. M.
General-biological character of the adaptive capacities of the metabolism of mammals in response to different extreme environmental factors p 1 A87-10440

GRANDMONTAGNE, M.
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687

GRANGE, C.
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699

GRIGORIEV, A. I.
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia p 16 N87-10701

GRINDELAND, R.
Animal studies on Spacelab-3 p 8 N87-10704

GUELL, A.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703

GUEZENNEC, C. Y.
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135

GUEZENNEC, Y.
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678

GUST, D.
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641

GUTKOVSKA, J.
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699

GUY, A. W.
The microwave problem p 19 A87-11209
Effects of long-term radiofrequency radiation on immunological competence and metabolism [AD-A169064] p 9 N87-11479

H

HENRIKSSON, C.
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137

HOLMAN, L. K. B.
THe effects of terrain clutter on observer behaviour during search of complex scenery [BAE-BT-13535] p 18 N87-11484

HOLY, X.
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683

HOOKE, L. R.
USSR Space Life Sciences Digest, issue 8 [NASA-CR-3922(09)] p 8 N87-11478

HOYLE, F.
A laboratory experiment with relevance to the survival of micro-organisms entering a planetary atmosphere p 22 A87-12200

HUNT, J. J.
Proceedings of 2nd International Conference on Space Physiology [ESA-SP-237] p 12 N87-10675

HUNT, R. M.
Human factors of intelligent computer aided display design p 19 A87-12216

I

ILIN, V. P.
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862

ILLE, H.
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568

ILYAN, E. A.
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708

IUNUSOVA, L. S.
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support p 21 A87-12879

IVANOVA, N. IU.
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850

J

JACKSON, W. G.
Women's G tolerance p 10 A87-11134

JANSON, H. A.
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688

JOHNSON, P. C.
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679

K

KANDEL, E. R.
The long and the short of long-term memory - A molecular framework p 2 A87-11626

KARCHER, G.
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564

KARNAUKH, I. M.
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862

KASATKINA, T. I.
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871

KAUNE, W. T.
Comparison of the coupling of grounded and ungrounded humans to vertical 60-Hz electric fields [DE86-011140] p 17 N87-10713

KEIL, L. C.
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans p 11 A87-11660

KERGUELEN, M.
Vestibular tests in cosmonaut selection and training p 15 N87-10694

KHOKHLOV, I. V.
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665

KIMURA, H.
Control of ventilation in extreme-altitude climbers p 11 A87-11654

KISTLER, L. M.
Comparison of the coupling of grounded and ungrounded humans to vertical 60-Hz electric fields [DE86-011140] p 17 N87-10713

KIZEL, V. A.
Physical causes of the asymmetry of living systems p 2 A87-11326

KLIACHKO-GURVICH, G. L.
Compounds of steroid nature in unicellular algae p 5 A87-12861

KNIZHNIKOV, V. A.
Natural radiation background - Aspects of radionuclide migration and biological effects p 1 A87-10661

KOBRICK, J. L.
A system for controlled presentation of the Arden contrast sensitivity test [AD-A167969] p 17 N87-10712

KOCHETOVA, G. I.
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876

KONDRATEVA, E. M.
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support p 21 A87-12879

KORDIUM, E. L.
Submicroscopic organization of Chlorella cells growing for nine days aboard Salyut-6 p 5 A87-12863

KORDIUM, V. A.
Microorganisms in artificial ecosystems p 20 A87-12851

KOSTINA, L. N.
The viability and the mutability of plants after space flight p 4 A87-12852

KOVROV, B. G.
Microorganisms in artificial ecosystems
p 20 A87-12851
Biotesting of the atmosphere of a closed ecosystem by means of microorganisms p 20 A87-12875
KRAPIVIN, S. V.
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior
p 3 A87-12798
KRASAVIN, E. A.
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
KRASOTCHENKO, L. M.
The effect of the nitrogen source in the growth medium on the carbohydrate composition of Chlorella grown under intense continuous cultivation p 5 A87-12865
Growth and development of algae under cumulative cultivation after exposure to weightlessness
p 6 A87-12868
KRAVIK, S. E.
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans p 11 A87-11660
KRICHEVSKAIA, A. A.
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress
p 3 A87-12800
KRUPENNIKOVA, E. IU.
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress
p 3 A87-12800
KULAEV, B.
Cosmos 1514 flight: Study of rhesus monkey ECG
p 8 N87-10707
KUNZ, L. L.
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479
KURIYAMA, T.
Control of ventilation in extreme-altitude climbers
p 11 A87-11654

L

LACOUR, J. R.
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise
p 14 N87-10685
LARSEN, R.
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
LAUGHLIN, M. H.
Atropine - No effect on exercise muscle hyperemia in conscious rats p 3 A87-11657
LAVIE, P.
Ultradiant rhythms in physiology and behavior
p 1 A87-10298
LAYTON, R. P.
Respiratory mechanics in men following a deep air dive p 11 A87-11659
LEACH, C. S.
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679
LEBEDEV, V. I.
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
LEBEDEVA, E. K.
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of Closteriopsis acicularis var. africana Hind.
p 6 A87-12867
LEGER, A.
Vestibular tests in cosmonaut selection and training
p 15 N87-10694
LEGG, S., J.
Prediction of the metabolic cost of exercise from measurements during recovery
[AD-A168076] p 17 N87-11482
LEGUAY, G.
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573
LEJEUNE, D.
Vestibular tests in cosmonaut selection and training
p 15 N87-10694
LENCKI, W.
Animal studies on Spacelab-3 p 8 N87-10704
LEONARD, J. I.
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709
LEROY, M.
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680
LESTIENNE, F.
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight
p 14 N87-10692
LETOULLEC, C.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
LEVINSKIKH, M. A.
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of Closteriopsis acicularis var. africana Hind.
p 6 A87-12867
The gas exchange characteristics of an intensive culture of Closteriopsis acicularis var. africana Hind.
p 6 A87-12870
LIBIKOVA, N. I.
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
LIDDELL, P. A.
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641
LIKHOGRUDOVA, L. E.
The use of the dominant-index principle to develop complex bioengineering life-support systems
p 20 A87-12872
LISCIA, P.
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
LIUBIMOVA, E. D.
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860
LIVANSKAIA, O. G.
Mineral nutrition of dense populations of Euglena
p 6 A87-12869
LIZUNOVA, I. I.
The thermoregulatory characteristics of inhabitants of different climatic-geographical regions during adaptation to moderate climate p 12 A87-12923
LOEPPKY, J. A.
Validation and application of single breath cardiac output determinations in man p 11 A87-11136
LUFT, U. C.
Validation and application of single breath cardiac output determinations in man p 11 A87-11136
LUNDBERG, B. G.
On actions due to lack of information
[REPT-85-45] p 18 N87-11486

M

MAGEDOC, V.
Cosmos 1514 flight: Study of rhesus monkey ECG
p 8 N87-10707
MAGEDOV, V. S.
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
MAKSIMOVA, I. V.
The effect of illumination on the antibacterial activity of microalgae p 5 A87-12864
MANUKOVSKII, N. S.
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876
MARKELOVA, A. G.
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860
MARTYN, G. M.
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
MARTYNOV, V. A.
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850
MASHINSKII, A. L.
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
The use of the dominant-index principle to develop complex bioengineering life-support systems
p 20 A87-12872
MASUYAMA, S.
Control of ventilation in extreme-altitude climbers
p 11 A87-11654
MATSUBARA, H.
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
MAUROUX, J. L.
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
MAYET, M. H.
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
MEEHAN, R. T.
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697
MEKHTI-ZADE, E. R.
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors
p 4 A87-12853
MELESHKO, G. I.
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of Closteriopsis acicularis var. africana Hind.
p 6 A87-12867
MELLO, R.
Prediction of the metabolic cost of exercise from measurements during recovery
[AD-A168076] p 17 N87-11482
MELNICHENKO, V.
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
MELNITCHENKO, V.
Cosmos 1514 flight: Study of rhesus monkey ECG
p 8 N87-10707
MENU, J. P.
Mental workload, the validation in France of an American subjective technique - SWAT p 18 A87-10570
MERINO, D.
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
MIDY, F.
Vestibular tests in cosmonaut selection and training
p 15 N87-10694
MIKELADZE, G. G.
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
MIKHALEVA, I. I.
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress
p 3 A87-12800
MIKKAILOV, V. M.
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia p 16 N87-10701
MILEVSKII, E. I.
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
MILHAUD, C.
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
Cosmos 1514 flight: Study of rhesus monkey ECG
p 8 N87-10707
MILHAUD, C. L.
Animal models in space physiology p 8 N87-10705
MILLER, M. C.
Comparison of the coupling of grounded and ungrounded humans to vertical 60-Hz electric fields
[DE86-011140] p 17 N87-10713
MINAIRE, P.
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
MOORE, T. A.
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641
MOROZOV, V. A.
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850
MORUKOV, B. V.
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Metabolic changes during prolonged antiorthostatic hypokinesia p 15 N87-10698
MOSTOVNIKOV, V. A.
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
MOUNIER, Y.
The muscular system in weightlessness
p 13 N87-10682
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683

MUELLER-KLIESER, W.
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
MULLEN, S.
A system for controlled presentation of the Arden contrast sensitivity test
[AD-A167969] p 17 N87-10712
MUSIN, R. F.
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850
MYHRE, L. G.
Validation and application of single breath cardiac output determinations in man p 11 A87-11136

N

NAGIEVA, D. N.
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
NASONOVA, E. A.
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
NEALE, L.
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697
NECHITAILO, G. S.
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
Submicroscopic organization of Chlorella cells growing for nine days aboard Salyut-6 p 5 A87-12863
NEDUKHA, E. M.
Structural-functional characteristics of funaria hygrometrica moss protonema cells under prolonged rotation on a clinostat p 4 A87-12855
NEFEDOVA, E. L.
The effect of the nitrogen source in the growth medium on the carbohydrate composition of Chlorella grown under intense continuous cultivation p 5 A87-12865
NEROBKOVA, L. N.
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
NINOMIYA, I.
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
NISBET, E. G.
RNA and hot-water springs p 22 A87-10197
NOGUES, C.
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
NORSK, P.
Cardiovascular measurements in microgravity p 12 N87-10676

O

OGANOV, V. S.
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708
OLLIVIER, J.
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
OPARINA, D. IA.
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
OVRUTSKAIA, I. I.
Structural-functional characteristics of funaria hygrometrica moss protonema cells under prolonged rotation on a clinostat p 4 A87-12855

P

PAILLARD, F.
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
PALEEVA, M. A.
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
PALLE, S.
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
PANKOVA, I. I.
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876
PATAT, L.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
PATTON, J. F.
Upper and lower body anaerobic power comparison between biathletes and control subjects
[AD-A167636] p 16 N87-10710
PELTO, P. J.
Development of an expert systems computer program for control panel design enhancement
[DE86-012153] p 22 N87-11489
PEQUIGNOT, J. M.
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
PESQUIES, P.
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707
PESQUIES, P. C.
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
PEYRIN, L.
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
PHILIPS, P. L.
An experimental design for colour sensitivity in target acquisition
[BAE-BT-12489-VOL-1] p 22 N87-11490
An experimental design for colour sensitivity in target acquisition, volume 2
[BAE-BT-12489-VOL-2] p 22 N87-11491
PILONCHERY, G.
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
PODLUTSKII, A. G.
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
POIRIER, J. L.
Mechanical solid vibrations. II - Low and high frequency vibrations p 10 A87-10571
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
POKROVSKAIA, E. I.
Mineral nutrition of dense populations of Euglena p 6 A87-12869
POPOVA, A. F.
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862
Submicroscopic organization of Chlorella cells growing for nine days aboard Salyut-6 p 5 A87-12863
POPOVA, I. A.
Metabolic changes during prolonged antiorthostatic hypokinesia p 15 N87-10698
POTTIER, J. M.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
POULETTY, P.
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680
POURCELOT, L.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700

R

RADTKE, M.
USSR Space Life Sciences Digest, issue 8
[NASA-CR-3922(09)] p 8 N87-11478
RAKHMANOV, A. S.
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
REBOLLO, C.
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680
REVENKO, S. K.
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
RIBOT, E.
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139
RIFFAT, G.
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
ROCK, P. B.
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
ROLL, J. P.
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139
RONCIN, A.
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
ROUGIER, Y.
Malignant melanomas and flight fitness p 9 A87-10566
ROWE, J. E.
USSR Space Life Sciences Digest, issue 8
[NASA-CR-3922(09)] p 8 N87-11478
RUMMEL, J. A.
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709

S

SADA, K.
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
SALAMATOVA, L. V.
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860
SANCHEZDECARMONA, L.
Human comfort in the urban tropics p 21 N87-10649
SANTUCCI, G.
Mental workload, the validation in France of an American subjective technique - SWAT p 18 A87-10570
SASSOLAS, A.
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
SATABIN, P.
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
SAVILOV, A. A.
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia p 16 N87-10701
SCHACHER, S.
The long and the short of long-term memory - A molecular framework p 2 A87-11626
SCHADE, C. M.
Women's G tolerance p 10 A87-11134
SCHATTE, C.
Animal studies on Spacelab-3 p 8 N87-10704
SCHMIDT, R. A.
Controlling the temporal structure of limb movements: A response
[AD-A169261] p 21 N87-11488
SCHULZ, H.
Ultradiant rhythms in physiology and behavior p 1 A87-10298

SCINTO, L. F.
Research in the area of visual search [AD-A168923] p 18 N87-11483
SEIGNEURIC, A.
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
Malignant melanomas and flight fitness p 9 A87-10566
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573
SEMENENKO, V. E.
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
Compounds of steroid nature in unicellular algae p 5 A87-12861
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871
SEMENOV, IA. V.
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
SEMPORE, B.
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
SERRURIER, B.
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
SEVERIN, A. E.
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922
SHAPIGUZOV, IU. M.
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
SHAROVA, L. A.
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
SHCHELTSYN, L. K.
Corticofugal effects on the reticular formation and heart rhythm p 7 A87-12920
SHEIN, V. I.
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
SHELEPINA, E. P.
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
SHEVCHENKO, L. V.
Morphofunctional indices of animals' individual resistance to hypoxia p 7 A87-12921
SHIRAI, M.
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
SHIRVINSKAYA, M. A.
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
SHTARK, M. B.
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
SIDORENKO, P. G.
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
SIDOROVA, O. A.
The effect of illumination on the antibacterial activity of microalgae p 5 A87-12864
SKURATOVA, S. A.
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
SLASHCHEVA, N. K.
Effect of space flight factors on Chlorella p 4 A87-12858
SOKHADZE, E. M.
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
SONNECK, J. M.
Malignant melanomas and flight fitness p 9 A87-10566
SOROKINA, T. A.
Bacteria of the Pseudomonas genus isolated from the ice sheet of an Antarctic glacier p 6 A87-12888
STARSHINOV, IU. P.
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922
STEWART, D. F.
Space motion sickness p 15 N87-10693
STRELNIKOV, IU. E.
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
SUGITA, T.
Control of ventilation in extreme-altitude climbers p 11 A87-11654
SUKHOVA, N. I.
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877
SUVOROV, N. B.
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
SYCHEV, V. N.
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868

T

TALAN, M. I.
Learned control of heart rate during dynamic exercise in nonhuman primates p 3 A87-11656
TARASENKO, V. A.
Ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity p 4 A87-12856
TASKAEV, A. I.
Natural radiation background - Aspects of radionuclide migration and biological effects p 1 A87-10661
TATSUMI, K.
Control of ventilation in extreme-altitude climbers p 11 A87-11654
TAUTS, M. I.
Compounds of steroid nature in unicellular algae p 5 A87-12861
TAYLOR, G. R.
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697
TCHAMURLIEV, G.
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707
TEETER, R.
USSR Space Life Sciences Digest, issue 8 [NASA-CR-3922(09)] p 8 N87-11478
TIRRANEN, L. S.
Biotesting of the atmosphere of a closed ecosystem by means of microorganisms p 20 A87-12875
TRAVKIN, V. I.
The use of the dominant-index principle to develop complex bioengineering life-support systems p 20 A87-12872
TRETIAKOV, V. P.
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
TRUBACHEV, I. N.
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876

U

URIASH, V. V.
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
USHAKOV, A. S.
Metabolic changes during prolonged antiorthostatic hypokinesia p 15 N87-10698

V

VAN LUNTEREN, E.
Electrical and mechanical activity of respiratory muscles during hypercapnia p 3 A87-11658
VANDENBOSCH, P. M.
Radiation doses from flying through nuclear debris clouds [AD-A167959] p 17 N87-10711
VANDERPLOEG, J. M.
Space motion sickness p 15 N87-10693
VASILEVSKII, N. N.
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
VAULINA, E. N.
The viability and the mutability of plants after space flight p 4 A87-12852
Effect of space flight factors on Chlorella p 4 A87-12858
VAUPEL, P.
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
VEDENEEV, A. N.
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871
VICO, L.
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
VIEILLEFOND, H.
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
VIEVILLE, T.
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
VINCENT, M.
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
VLADIMIROVA, M. G.
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860
VLASOVA, I. G.
Adaptation and biorhythms p 7 A87-12925
VOGEL, J. A.
Prediction of the metabolic cost of exercise from measurements during recovery [AD-A168076] p 17 N87-11482
VORONINA, T. A.
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798

W

WADE, C. E.
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans p 11 A87-11660
WAKABAYASHI, S.
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
WALIGORA, J.
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697
WARME-JANVILLE, B.
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
WASIELEWSKI, M. R.
Ultrafast carotenoid to pheophorbide energy transfer in a biomimetic model for antenna function in photosynthesis p 3 A87-11641
WEBSTER, D. A.
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
WEIHE, W. H.
Life expectancy in tropical climates and urbanization p 21 N87-10648
WHITE, R. J.
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709
WICKRAMASINGHE, N. C.
A laboratory experiment with relevance to the survival of micro-organisms entering a planetary atmosphere p 22 A87-12200
WOODRUM, A.
Radiation doses from flying through nuclear debris clouds [AD-A167959] p 17 N87-10711
WOODS, J. J.
Fatigue of intermittent submaximal voluntary contractions Central and peripheral factors p 11 A87-11651
WORTMAN, A.
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber p 16 N87-10702

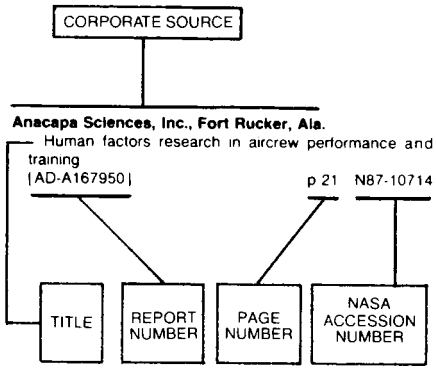
Y

YOUNG, A. J.
The effect of spironolactone on the cardiocirculatory responses to upright tilt at sea level and at simulated high altitude p 11 A87-11138
YOUNG, J. C.
Effect of hyperoxia on substrate utilization during intense submaximal exercise p 11 A87-11655

Z

ZAICHICK, V. E.
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
ZANDER, R.
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
ZELTZER, H. I.
A system for controlled presentation of the Arden contrast sensitivity test
[AD-A167969] p 17 N87-10712
ZHADKO, S. I.
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions
p 5 A87-12862
ZOLOTAREVA, N. N.
General-biological character of the adaptive capacities of the metabolism of mammals in response to different extreme environmental factors p 1 A87-10440

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document.

A

Anacapa Sciences, Inc., Fort Rucker, Ala.
Human factors research in aircrew performance and training
[AD-A167950] p 21 N87-10714

Army Research Inst. of Environmental Medicine, Natick, Mass.
Upper and lower body anaerobic power comparison between biathletes and control subjects
[AD-A167636] p 16 N87-10710
A system for controlled presentation of the Arden contrast sensitivity test
[AD-A167969] p 17 N87-10712
Prediction of the metabolic cost of exercise from measurements during recovery
[AD-A168076] p 17 N87-11482

B

British Aerospace Public Ltd. Co., Bristol (England).
THe effects of terrain clutter on observer behaviour during search of complex scenery
[BAE-BT-13535] p 18 N87-11484
Air-to-ground target acquisition in the presence of sensor vibration
[BAE-BT-14222] p 18 N87-11485
An experimental design for colour sensitivity in target acquisition
[BAE-BT-12489-VOL-1] p 22 N87-11490
An experimental design for colour sensitivity in target acquisition, volume 2
[BAE-BT-12489-VOL-2] p 22 N87-11491

Brookhaven National Lab., Upton, N. Y.
Anaerobic microbial transformations in subsurface environments: Highlights
[DE86-008703] p 9 N87-11480

C

California Univ., Los Angeles.
Controlling the temporal structure of limb movements: A response
[AD-A169261] p 21 N87-11488

Centre d'Essais en Vol, Bretigny-sur-Orge (France).
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
Vestibular tests in cosmonaut selection and training p 15 N87-10694

Centre d'Etudes et de Recherches de Medecine Aeronautique, Paris (France).
Animal models in space physiology p 8 N87-10705
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707

Centre Hospitalier Univ. Hangueil, Toulouse (France).
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677

Centre National d'Etudes Spatiales, Toulouse (France).
Infrared measurement of eye movement. Presentation of the Eye Movement in Infrared and Angular Torsion (EMIRAT) experiment p 15 N87-10695

Centre National de la Recherche Scientifique, Lyon (France).
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687

Centre National de la Recherche Scientifique, Paris (France).
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692

Copenhagen Univ. (Denmark).
Cardiovascular measurements in microgravity p 12 N87-10676

E

Erlangen-Nuremberg Univ. (West Germany).
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber p 16 N87-10702

European Space Agency, Paris (France).
Proceedings of 2nd International Conference on Space Physiology
[ESA-SP-237] p 12 N87-10675
The muscular system in weightlessness p 13 N87-10682

G

Groupe d'Etude en Medecine et Physiologie Spatiales, Toulouse (France).
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696

Gulf and Western Applied Science Labs., Waltham, Mass.
Research in the area of visual search
[AD-A168923] p 18 N87-11483

H

Hopital Lariboisiere, Paris (France).
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680

Hopital Nord, Saint-Priest-en-Jarez (France).
Bones and weightlessness p 13 N87-10681
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691

Human Engineering Labs., Aberdeen Proving Ground, Md.
Anthropometric considerations for a four-axis side-arm flight controller
[AD-A168135] p 21 N87-11487

I

Institute of Biomedical Problems, Moscow (USSR).
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Metabolic changes during prolonged antiorthostatic hypokinesia p 15 N87-10698
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia p 16 N87-10701
The state of bones of pregnant rats during an acute stage of adaptation to weightlessness p 8 N87-10708

L

Letterman Army Inst. of Research, San Francisco, Calif.
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans p 11 A87-11660

Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
Validation and application of single breath cardiac output determinations in man p 11 A87-11136

Lyon-1 Univ. (France).
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703

M

Management and Technical Services Co., Washington, D.C.
USSR Space Life Sciences Digest, issue 8
[NASA-CR-3922(09)] p 8 N87-11478

N

National Aeronautics and Space Administration, Washington, D.C.
Aerospace medicine and biology: A continuing bibliography with indexes
[NASA-SP-7011(289)] p 12 N87-10674
Animal studies on Spacelab-3 p 8 N87-10704
Math modelling as a complement to the scientific inquiry of physiological adaptation to space flight: Fluid, endocrine and circulatory regulation p 16 N87-10709

National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Effect of antigravity suit inflation on cardiovascular, PRA, and PVP responses in humans p 11 A87-11660

National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
The regulation of fluid and electrolyte metabolism in weightlessness p 13 N87-10679
Space motion sickness p 15 N87-10693
The use of decompression to simulate the effect of extravehicular activity on human lymphocyte transformation p 15 N87-10697

P

Pacific Northwest Labs., Richland, Wash.
Comparison of the coupling of grounded and ungrounded humans to vertical 60-Hz electric fields
[DE86-011140] p 17 N87-10713
Development of an expert systems computer program for control panel design enhancement
[DE86-012153] p 22 N87-11489

S

School of Aerospace Medicine, Brooks AFB, Tex.
Radiation doses from flying through nuclear debris clouds
[AD-A167959] p 17 N87-10711
Search Technology, Inc., Norcross, Ga.
Human factors of intelligent computer aided display design p 19 A87-12216

T

Technische Hogeschool, Delft (Netherlands).
On actions due to lack of information
[REPT-85-45] p 18 N87-11486

U

Umpqua Research Co., Myrtle Creek, Ore.
A prototype space flight intravenous injection system
[NASA-CR-171911] p 17 N87-11481
Universite des Sciences et Techniques de Lille (France).
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683

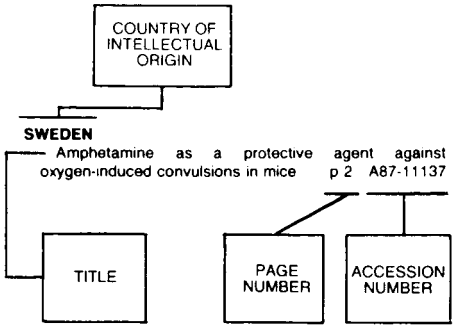
W

Washington Univ., Seattle.
Effects of long-term radiofrequency radiation on immunological competence and metabolism
[AD-A169064] p 9 N87-11479
World Meteorological Organization, Geneva (Switzerland).
Human comfort in the urban tropics
p 21 N87-10649

Z

Zurich Univ. (Switzerland).
Life expectancy in tropical climates and urbanization
p 21 N87-10648

Typical Foreign Technology Index Listing



Listings in this index are arranged alphabetically by country of intellectual origin. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the citation in the abstract section.

C

CANADA
RNA and hot-water springs p 22 A87-10197

D

DENMARK
Cardiovascular measurements in microgravity p 12 N87-10676

F

FRANCE
The role of vagal tonus in slight atrioventricular blocks in pilots p 9 A87-10562
The flight of the biosatellite Cosmos 1514 - An ECG study of Rhesus Macaque monkeys p 1 A87-10563
Exercise-based thallium myocardial tomography for diagnosing coronary insufficiency - Of interest for expertise with flight personnel p 9 A87-10564
Sickle cell disease and flight personnel p 9 A87-10565
Malignant melanomas and flight fitness p 9 A87-10566
A projective test applied in psychological testing of military flight personnel - The aero TAT p 18 A87-10567
The right ventricle and sustained, intense +Gz accelerations p 10 A87-10568
Exercise echocardiography - Potential application for monitoring the hearts of cosmonauts during long duration missions p 10 A87-10569
Mental workload, the validation in France of an American subjective technique - SWAT p 18 A87-10570
Mechanical solid vibrations. II - Low and high frequency vibrations p 10 A87-10571
Nutrition and sustained physical activities - Survival situations p 10 A87-10572
The respiratory apparatus in aeronautical and space medicine p 10 A87-10573
Effect of hypoxia on heart glycogen utilization during exercise p 2 A87-11135
Comparative effects of whole-body vibration on sensorimotor performance achieved with a mini-stick and a macro-stick in force and position control modes p 19 A87-11139
Proceedings of 2nd International Conference on Space Physiology [ESA-SP-237] p 12 N87-10675
Cardiovascular examination during STS 51 G mission June (1985) p 12 N87-10677
The interest of centrifuge tests for the selection of French cosmonauts p 13 N87-10678
Anticortisol monoclonal antibodies: Characterization of their specificity p 13 N87-10680
Bones and weightlessness p 13 N87-10681
The muscular system in weightlessness p 13 N87-10682
Microgravity effects on the contractile proteins of rat muscles p 13 N87-10683
Weightlessness effects on the bone tissue of rats after a 5 day space flight (Cosmos 1514) p 13 N87-10684
Bone tissue and muscular performance in a population of elderly men as a function of physical exercise p 14 N87-10685
Hindlimb suspension effects on rat skeletal muscle response p 8 N87-10687
Histomorphometric study of bone cell mass and activity in man caused by a 120 day decubitus. Test of preventive protocols p 14 N87-10689
Amputation-induced osteoporosis: A new model to explore the effects of weightlessness on the human skeleton p 14 N87-10690
Weightlessness effects on the phosphorus-calcium balance and its hormonal regulation in man during STS flight 51-G p 14 N87-10691
Preliminary results on the equilibrium and vertigo experiment performed during STS 51-G shuttle flight p 14 N87-10692
Vestibular tests in cosmonaut selection and training p 15 N87-10694
Infrared measurement of eye movement. Presentation of the Eye Movement in Infrared and Angular Torsion (EMIRAT) experiment p 15 N87-10695
Ground based simulation techniques for cardiovascular and hormonal changes observed in man in weightlessness p 15 N87-10696
Levels of plasma atrial natriuretic factor (alpha h ANF) during acute simulated weightlessness p 15 N87-10699
Volume regulating hormones during a 5 hour head-down tilt at -10 deg. Part 1: Epinephrine, norepinephrine and dopamine p 16 N87-10700
Volume regulating hormones during a 5-hour head-down tilt at -10 deg. Part 2: Plasma renin activity and aldosterone p 16 N87-10703
Animal models in space physiology p 8 N87-10705
Contribution of animal models to the investigation of bone changes in weightlessness p 8 N87-10706
Cosmos 1514 flight: Study of rhesus monkey ECG p 8 N87-10707

G

GERMANY,FEDERAL REPUBLIC OF
Ultradiant rhythms in physiology and behavior p 1 A87-10298
A new photometric method for oxygen consumption measurements in cell suspensions p 3 A87-11653
Exercise-induced myocardial ischemia at high altitude simulated in a negative pressure chamber p 16 N87-10702

J

JAPAN
Primary sequence of a dimeric bacterial haemoglobin from Vitreoscilla p 2 A87-11634
Effects of regional alveolar hypoxia and hypercapnia on small pulmonary vessels in cats p 3 A87-11652
Control of ventilation in extreme-altitude climbers p 11 A87-11654

N

NETHERLANDS
On actions due to lack of information [REPT-85-45] p 18 N87-11486

S

SWEDEN
Amphetamine as a protective agent against oxygen-induced convulsions in mice p 2 A87-11137
SWITZERLAND
Life expectancy in tropical climates and urbanization p 21 N87-10648
Human comfort in the urban tropics p 21 N87-10649

U

U.S.S.R.
General-biological character of the adaptive capacities of the metabolism of mammals in response to different extreme environmental factors p 1 A87-10440
Natural radiation background - Aspects of radionuclide migration and biological effects p 1 A87-10661
Comparative study of the biological properties of some bacterial polysaccharides p 1 A87-10662
Systemic effects of the interaction of a living organism with microwaves p 2 A87-10663
The effect of inhibitors of DNA synthesis on the sensitivity of mammalian cells to ionizing radiation of different linear energy transfer levels p 2 A87-10664
Changes in the ATP content and the surface adhesion in cultured human cells irradiated by lasers rays in the near-UV range p 2 A87-10665
Physical causes of the asymmetry of living systems p 2 A87-11326
Organization of a biofeedback system on the basis of a laboratory microcomputer system p 19 A87-12450
Changes in the membrane proteins of rat brain stem under REM-sleep deprivation, and the duration of the REM phase during subsequent unrestrained behavior p 3 A87-12798
Electrical instability of the heart in animals with different resistance to immobilization stress p 3 A87-12799
The effect of the delta-sleep-inducing peptide on the condition of the brain membranes under the cold stress p 3 A87-12800
Sensitivity of the human skin to infrared thermal radiation fluxes p 12 A87-12850
Microorganisms in artificial ecosystems p 20 A87-12851
The viability and the mutability of plants after space flight p 4 A87-12852
The effect of auxin on the mutability and growth activity of plants after exposure to space flight factors p 4 A87-12853
Modification by alpha-tocopherol of the mutational process in the seeds of the Welsh onion subsequent to a prolonged space flight p 4 A87-12854
Structural-functional characteristics of funaria hygrometrica moss protonema cells under prolonged rotation on a clinostat p 4 A87-12855
Ultrastructure of the root cap of Arabidopsis plants under normal conditions and under hypogravity p 4 A87-12856
Morphological and functional state of the photosynthetic apparatus of plant cells cultivated over different periods of time during a space flight p 4 A87-12857
Effect of space flight factors on Chlorella p 4 A87-12858
Qualitative assessment of specific immunofluorescence in pyrenoid as a gigantic carboxysome p 4 A87-12859
Prolonged storage of unicellular algae in a collection without periodic reseeding p 5 A87-12860

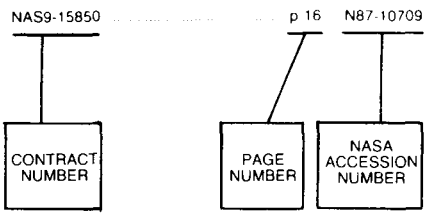
FOREIGN

Compounds of steroid nature in unicellular algae p 5 A87-12861
Adaptation of unicellular algae and tissue cultures of higher plants to hypogravity conditions p 5 A87-12862
Submicroscopic organization of Chlorella cells growing for nine days aboard Salyut-6 p 5 A87-12863
The effect of illumination on the antibacterial activity of microalgae p 5 A87-12864
The effect of the nitrogen source in the growth medium on the carbohydrate composition of Chlorella grown under intense continuous cultivation p 5 A87-12865
Comparison of the characteristics of algal growth in weightlessness using live and fixed biological material p 5 A87-12866
The effect of the main physical characteristics of the nutrient medium on the growth rate and photosynthesis of *Closteriopsis acicularis var. africana Hind.* p 6 A87-12867
Growth and development of algae under cumulative cultivation after exposure to weightlessness p 6 A87-12868
Mineral nutrition of dense populations of Euglena p 6 A87-12869
The gas exchange characteristics of an intensive culture of Closteriopsis acicularis var. africana Hind. p 6 A87-12870
Regulation of cellular synthesis of ribulose-1,5-diphosphate carboxylase and its subunits p 6 A87-12871
The use of the dominant-index principle to develop complex bioengineering life-support systems p 20 A87-12872
The gas balance in an electrolysis/hydrogen bacteria system p 20 A87-12873
The possibility of using cultured cells of higher plants in life support systems p 20 A87-12874
Biotesting of the atmosphere of a closed ecosystem by means of microorganisms p 20 A87-12875
The use of higher edible fungi in artificial ecosystems that include man p 20 A87-12876
Estimating the biomass and the energy contents of Chlorella using the 'man-algae mineralization' model of a biological life support system p 21 A87-12877
An approximation method for studying the productivity dynamics of a biological life support system when changing the operating mode p 21 A87-12878
Formation of a microbial cenosis in the photoautotrophic component of a biological system of human life-support p 21 A87-12879
Bacteria of the Pseudomonas genus isolated from the ice sheet of an Antarctic glacier p 6 A87-12888
Comparative assessment of methods for studying the physical work capacity of irradiated animals p 6 A87-12889
Adaptation of humans and animals to extreme environmental conditions p 7 A87-12918
The physiological mechanisms of adaptation to hypoxia p 7 A87-12919
Corticofugal effects on the reticular formation and heart rhythm p 7 A87-12920
Morphofunctional indices of animals' individual resistance to hypoxia p 7 A87-12921
Features of the regulation of the cardiorespiratory system in humans during adaptation to a hot climate p 12 A87-12922
The thermoregulatory characteristics of inhabitants of different climatic-geographical regions during adaptation to moderate climate p 12 A87-12923
Functions of the human organism during prolonged stay and work in extreme conditions of caves p 12 A87-12924
Adaptation and biorhythms p 7 A87-12925
Functions of skeletal muscles of rats and monkeys after 5-day space flight (on Cosmos 1514) p 7 N87-10686
Bone examination by noninvasive techniques in a 120-day head-down tilt test p 14 N87-10688
Metabolic changes during prolonged antiorthostatic hypokinesia p 15 N87-10698
Relationship between cardiovascular functions and fluid-electrolyte metabolism during antiorthostatic hypokinesia p 16 N87-10701
The state of bones of pregnant rats during an acute *stage of adaptation to weightlessness* p 8 N87-10708

UNITED KINGDOM

A laboratory experiment with relevance to the survival of micro-organisms entering a planetary atmosphere p 22 A87-12200
THe effects of terrain clutter on observer behaviour during search of complex scenery [BAE-BT-13535] p 18 N87-11484
Air-to-ground target acquisition in the presence of sensor vibration [BAE-BT-14222] p 18 N87-11485
An experimental design for colour sensitivity in target acquisition [BAE-BT-12489-VOL-1] p 22 N87-11490
An experimental design for colour sensitivity in target acquisition, volume 2 [BAE-BT-12489-VOL-2] p 22 N87-11491

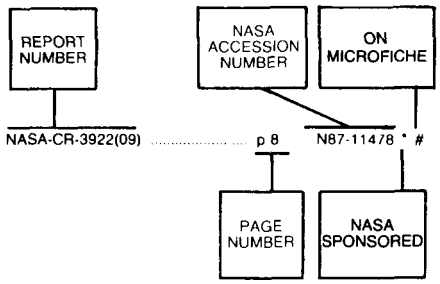
Typical Contract Number Index Listing



Listings in this index are arranged alpha-numerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the AIAA accession numbers appearing first. The accession number denotes the number by which the citation is identified in the abstract section. Preceding the accession number is the page number on which the citation may be found.

DA PROJ. 2Q1-61102-B-74-F	p 21	N87-11488
DA PROJ. 2Q2-63731-A-792	p 21	N87-10714
DA PROJ. 2Q2-63731-A-793	p 21	N87-10714
DAAG29-83-C-0014	p 18	N87-11483
DE-AC02-76CH-00016	p 9	N87-11480
DE-AC06-76RL-01830	p 17	N87-10713
	p 22	N87-11489
DE-FG02-84CH-10198	p 3	A87-11641
DRET-50-85-26	p 15	N87-10699
	p 16	N87-10700
	p 16	N87-10703
DRET-84-1046	p 10	A87-10568
F33615-83-C-0620	p 9	N87-11479
MDA903-81-C-0504	p 21	N87-10714
MDA903-85-K-0225	p 21	N87-11488
NASW-3676	p 8	N87-11478
NAS1-17874	p 19	A87-12216
NAS9-12572	p 11	A87-11136
NAS9-15487	p 16	N87-10709
NAS9-15850	p 16	N87-10709
NAS9-16328	p 16	N87-10709
NAS9-16337	p 17	N87-11481
NAS9-17151	p 16	N87-10709
NIH-AM-25472	p 3	A87-11657
NIH-GM-27085	p 2	A87-11634
NIH-HL-25830	p 3	A87-11658
NIH-HL-29428	p 3	A87-11657
NSF CHE-84-09644	p 3	A87-11641
NSF INT-82-12086	p 2	A87-11634
PHS-HL-30026	p 11	A87-11651
PHS-NS-14756	p 11	A87-11651
W-31-109-ENG-38	p 3	A87-11641

Typical Report Number Index Listing



Listings in this index are arranged alpha-numerically by report number. The page number indicates the page on which the citation is located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

AD-A167636 ..... p 16 N87-10710 #
AD-A167950 ..... p 21 N87-10714 #
AD-A167959 ..... p 17 N87-10711 #
AD-A167969 ..... p 17 N87-10712 #
AD-A168076 ..... p 17 N87-11482 #
AD-A168135 ..... p 21 N87-11487 #
AD-A168923 ..... p 18 N87-11483 #
AD-A169064 ..... p 9 N87-11479 #
AD-A169261 ..... p 21 N87-11488 #

ARI-RN-85-104 ..... p 21 N87-10714 #
ARI-RN-86-67 ..... p 21 N87-11488 #

ARO-20540.2-LS ..... p 18 N87-11483 #

ASI-479-19-1 ..... p 21 N87-10714 #

BAE-BT-12489-VOL-1 ..... p 22 N87-11490 #
BAE-BT-12489-VOL-2 ..... p 22 N87-11491 #
BAE-BT-13535 ..... p 18 N87-11484 #
BAE-BT-14222 ..... p 18 N87-11485 #

CONF-851027-11 ..... p 17 N87-10713 #
CONF-860658-1 ..... p 22 N87-11489 #

DE86-008703 ..... p 9 N87-11480 #
DE86-011140 ..... p 17 N87-10713 #
DE86-012153 ..... p 22 N87-11489 #

DOE/ER-0243 ..... p 9 N87-11480 #

ESA-SP-237 ..... p 12 N87-10675 #

ETN-86-97561 ..... p 12 N87-10675 #
ETN-86-97955 ..... p 22 N87-11490 #
ETN-86-97956 ..... p 22 N87-11491 #
ETN-86-97957 ..... p 18 N87-11484 #
ETN-86-97963 ..... p 18 N87-11485 #
ETN-86-98475 ..... p 18 N87-11486 #

HEL-TN-2-86 ..... p 21 N87-11487 #

ISSN-0379-6566 ..... p 12 N87-10675 #

LR46186-VOL-1 ..... p 22 N87-11490 #
LR46186-VOL-2 ..... p 22 N87-11491 #
LR46994 ..... p 18 N87-11484 #
LR48619 ..... p 18 N87-11485 #

NAS 1.21:7011(289) ..... p 12 N87-10674 * #
NAS 1.26:171911 ..... p 17 N87-11481 * #
NAS 1.26:3922(09) ..... p 8 N87-11478 * #

NASA-CR-171911 ..... p 17 N87-11481 * #
NASA-CR-3922(09) ..... p 8 N87-11478 * #
NASA-SP-7011(289) ..... p 12 N87-10674 * #

PNL-SA-13600 ..... p 17 N87-10713 #
PNL-SA-14013 ..... p 22 N87-11489 #

REPT-85-45 ..... p 18 N87-11486 #

USAFSAM-TR-85-105 ..... p 9 N87-11479 #
USAFSAM-TR-85-86 ..... p 17 N87-10711 #

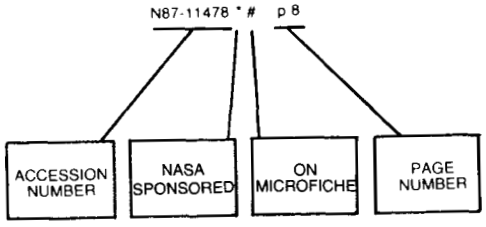
USARIEM-M-24/86 ..... p 17 N87-11482 #

USARIEM-M25/86 ..... p 16 N87-10710 #

USARIEM-T-3/86 ..... p 17 N87-10712 #

REPORT

Typical Accession Number Index Listing



Listings in this index are arranged alpha-numerically by accession number. The page number listed to the right indicates the page on which the citation is located. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A87-10172 # p 19
A87-10197 # p 22
A87-10298 # p 1
A87-10440 # p 1
A87-10562 # p 9
A87-10563 # p 1
A87-10564 # p 9
A87-10565 # p 9
A87-10566 # p 9
A87-10567 # p 18
A87-10568 # p 10
A87-10569 # p 10
A87-10570 # p 18
A87-10571 # p 10
A87-10572 # p 10
A87-10573 # p 10
A87-10661 # p 1
A87-10662 # p 1
A87-10663 # p 2
A87-10664 # p 2
A87-10665 # p 2
A87-11133 # p 19
A87-11134 # p 10
A87-11135 # p 2
A87-11136 * # p 11
A87-11137 # p 2
A87-11138 # p 11
A87-11139 # p 19
A87-11209 # p 19
A87-11326 # p 2
A87-11626 # p 2
A87-11634 # p 2
A87-11641 # p 3
A87-11651 # p 11
A87-11652 # p 3
A87-11653 # p 3
A87-11654 # p 11
A87-11655 # p 11
A87-11656 # p 3
A87-11657 # p 3
A87-11658 # p 3
A87-11659 # p 11
A87-11660 * # p 11
A87-12200 # p 22
A87-12216 * # p 19
A87-12450 # p 19
A87-12798 # p 3
A87-12799 # p 3
A87-12800 # p 3
A87-12850 # p 12
A87-12851 # p 20
A87-12852 # p 4
A87-12853 # p 4
A87-12854 # p 4
A87-12855 # p 4
A87-12856 # p 4
A87-12857 # p 4
A87-12858 # p 4
A87-12859 # p 4
A87-12860 # p 5
A87-12861 # p 5
A87-12862 # p 5
A87-12863 # p 5
A87-12864 # p 5
A87-12865 # p 5
A87-12866 # p 5
A87-12867 # p 6
A87-12868 # p 6
A87-12869 # p 6
A87-12870 # p 6
A87-12871 # p 6
A87-12872 # p 20
A87-12873 # p 20
A87-12874 # p 20
A87-12875 # p 20
A87-12876 # p 20
A87-12877 # p 21
A87-12878 # p 21
A87-12879 # p 21
A87-12888 # p 6
A87-12889 # p 6
A87-12918 # p 7
A87-12919 # p 7
A87-12920 # p 7
A87-12921 # p 7
A87-12922 # p 12
A87-12923 # p 12
A87-12924 # p 12
A87-12925 # p 7

N87-10648 p 21
N87-10649 p 21
N87-10674 * # p 12
N87-10675 # p 12
N87-10676 # p 12
N87-10677 # p 12
N87-10678 # p 13
N87-10679 # p 13
N87-10680 # p 13
N87-10681 # p 13
N87-10682 # p 13
N87-10683 # p 13
N87-10684 # p 13
N87-10685 # p 14
N87-10686 # p 7
N87-10687 # p 8
N87-10688 # p 14
N87-10689 # p 14
N87-10690 # p 14
N87-10691 # p 14
N87-10692 # p 14
N87-10693 # p 15
N87-10694 # p 15
N87-10695 # p 15
N87-10696 # p 15
N87-10697 # p 15
N87-10698 # p 15
N87-10699 # p 15
N87-10700 # p 16
N87-10701 # p 16
N87-10702 # p 16
N87-10703 # p 16
N87-10704 # p 8
N87-10705 # p 8
N87-10706 # p 8
N87-10707 # p 8
N87-10708 # p 8
N87-10709 # p 16
N87-10710 # p 16
N87-10711 # p 17
N87-10712 # p 17
N87-10713 # p 17
N87-10714 # p 21
N87-11478 * # p 8
N87-11479 # p 9
N87-11480 # p 9
N87-11481 * # p 17
N87-11482 # p 17
N87-11483 # p 18
N87-11484 # p 18
N87-11485 # p 18
N87-11486 # p 18
N87-11487 # p 21
N87-11488 # p 21
N87-11489 # p 22
N87-11490 # p 22
N87-11491 # p 22

AVAILABILITY OF CITED PUBLICATIONS

IAA ENTRIES (A87-10000 Series)

Publications announced in *IAA* are available from the AIAA Technical Information Service as follows: Paper copies of accessions are available at $10.00 per document (up to 50 pages), additional pages $0.25 each. Microfiche[1] of documents announced in *IAA* are available at the rate of $4.00 per microfiche on demand. Standing order microfiche are available at the rate of $1.45 per microfiche for *IAA* source documents and $1.75 per microfiche for AIAA meeting papers.

Minimum air-mail postage to foreign countries is $2.50. All foreign orders are shipped on payment of pro-forma invoices.

All inquiries and requests should be addressed to: Technical Information Service, American Institute of Aeronautics and Astronautics, 555 West 57th Street, New York, NY 10019. Please refer to the accession number when requesting publications.

STAR ENTRIES (N87-10000 Series)

One or more sources from which a document announced in *STAR* is available to the public is ordinarily given on the last line of the citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code preceded by the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on NTIS PRICE SCHEDULES.

Documents on microfiche are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26.1 reduction).

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: ESDU. Pricing information on specific data, computer programs, and details on ESDU topic categories can be obtained from ESDU International Ltd. Requesters in North America should use the Virginia address while all other requesters should use the London address, both of which are on page vi.

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Administration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: US Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of $1.50 each, postage free. (See discussion of NASA patents and patent applications below.)

Avail: (US Sales Only). These foreign documents are available to users within the United States from the National Technical Information Service (NTIS). They are available to users outside the United States through the International Nuclear Information Service (INIS) representative in their country, or by applying directly to the issuing organization.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC: NASA and NASA-sponsored documents and a large number of aerospace publications are available to the public for reference purposes at the library maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN: An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England for public access. The British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy or microfiche of NASA and NASA-sponsored documents, those identified by both the symbols # and * from ESA – Information Retrieval Service European Space Agency, 8-10 rue Mario-Nikis, 75738 CEDEX 15, France.

FEDERAL DEPOSITORY LIBRARY PROGRAM

In order to provide the general public with greater access to U.S. Government publications, Congress established the Federal Depository Library Program under the Government Printing Office (GPO), with 50 regional depositories responsible for permanent retention of material, inter-library loan, and reference services. At least one copy of nearly every NASA and NASA-sponsored publication, either in printed or microfiche format, is received and retained by the 50 regional depositories. A list of the regional GPO libraries, arranged alphabetically by state, appears on the inside back cover. These libraries are *not* sales outlets. A local library can contact a Regional Depository to help locate specific reports, or direct contact may be made by an individual.

STANDING ORDER SUBSCRIPTIONS

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS) on standing order subscription as PB 86-912300 at the price of $8.00 domestic and $16.00 foreign, and at $14.00 domestic and $28.00 foreign for the annual index. Standing order subscriptions do not terminate at the end of a year, as do regular subscriptions, but continue indefinitely unless specifically terminated by the subscriber. Questions on the availability of the predecessor publications, *Aerospace Medicine and Biology* (Volumes I-XI), should be directed to NTIS.

NTIS PRICE SCHEDULES

(Effective January 1, 1987)

Schedule A
STANDARD PRICE DOCUMENTS AND MICROFICHE

PRICE CODE	PAGE RANGE	NORTH AMERICAN PRICE	FOREIGN PRICE
A01	Microfiche	$ 6.50	$13.00
A02	001-025	9.95	19.90
A03	026-050	11.95	23.90
A04-A05	051-100	13.95	27.90
A06-A09	101-200	18.95	37.90
A10-A13	201-300	24.95	49.90
A14-A17	301-400	30.95	61.90
A18-A21	401-500	36.95	73.90
A22-A25	501-600	42.95	85.90
A99	601-up	*	*
NO1		45.00	80.00
NO2		48.00	80.00

Schedule E
EXCEPTION PRICE DOCUMENTS AND MICROFICHE

PRICE CODE	NORTH AMERICAN PRICE	FOREIGN PRICE
E01	$ 7.50	15.00
E02	10.00	20.00
E03	11.00	22.00
E04	13.50	27.00
E05	15.50	31.00
E06	18.00	36.00
E07	20.50	41.00
E08	23.00	46.00
E09	25.50	51.00
E10	28.00	56.00
E11	30.50	61.00
E12	33.00	66.00
E13	35.50	71.00
E14	38.50	77.00
E15	42.00	84.00
E16	46.00	92.00
E17	50.00	100.00
E18	54.00	108.00
E19	60.00	120.00
E20	70.00	140.00
E99	*	*

*Contact NTIS for price quote.

IMPORTANT NOTICE

NTIS Shipping and Handling Charges

U.S., Canada, Mexico — ADD $3.00 per TOTAL ORDER

All Other Countries — ADD $4.00 per TOTAL ORDER

Exceptions — Does NOT apply to:

ORDERS REQUESTING NTIS RUSH HANDLING
ORDERS FOR SUBSCRIPTION OR STANDING ORDER PRODUCTS *ONLY*

NOTE: Each additional delivery address on an order requires a separate shipping and handling charge.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

ESDU International, Ltd.
1495 Chain Bridge Road
McLean, Virginia 22101

ESDU International, Ltd.
251-259 Regent Street
London, W1R 7AD, England

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NTT-1)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center - MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS914
Denver, Colorado 80225

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NASA SP-7011 (294)		

4. Title and Subtitle	5. Report Date
Aerospace Medicine and Biology A Continuing Bibliography (Suppl. 294)	February 1987
	6. Performing Organization Code
7. Author(s)	8. Performing Organization Report No.
	10. Work Unit No.
9. Performing Organization Name and Address	
National Aeronautics and Space Administration Washington, DC 20546	11. Contract or Grant No.
	13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address	
	14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This bibliography lists 146 reports, articles and other documents introduced into the NASA scientific and technical information system in January, 1987.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Aerospace Medicine Bibliographies Biological Effects	Unclassified - Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price*
Unclassified	Unclassified	62	A04/HC

*For sale by the National Technical Information Service, Springfield, Virginia 22161

NASA-Langley, 1987